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ABSTRACT

Under this grant, the Florida State University committed itself to the strengthening of the University's capacity in applying a systems approach to the utilization of technology in education; to mobilize and extend further its competencies in this field; and, through its Center for Educational Technology (CET), to provide a special focus of its institutional capabilities and resources on the problems of education in developing nations. Specific objectives to be supported by the grant are: 1) plan and carry out a program of applied developmental research; 2) design and organize systematic approaches, alternative models, and optional arrangements for the application of educational technology; 3) provide educational training opportunities for U.S. and foreign personnel; 4) develop an information center on educational technology; 5) establish interinstitutional linkages with appropriate organizations in developing nations; and 6) serve as a basic intellectual resource center within the United States. This report provides detailed explanations and evaluations of the first year's operations. (MC)

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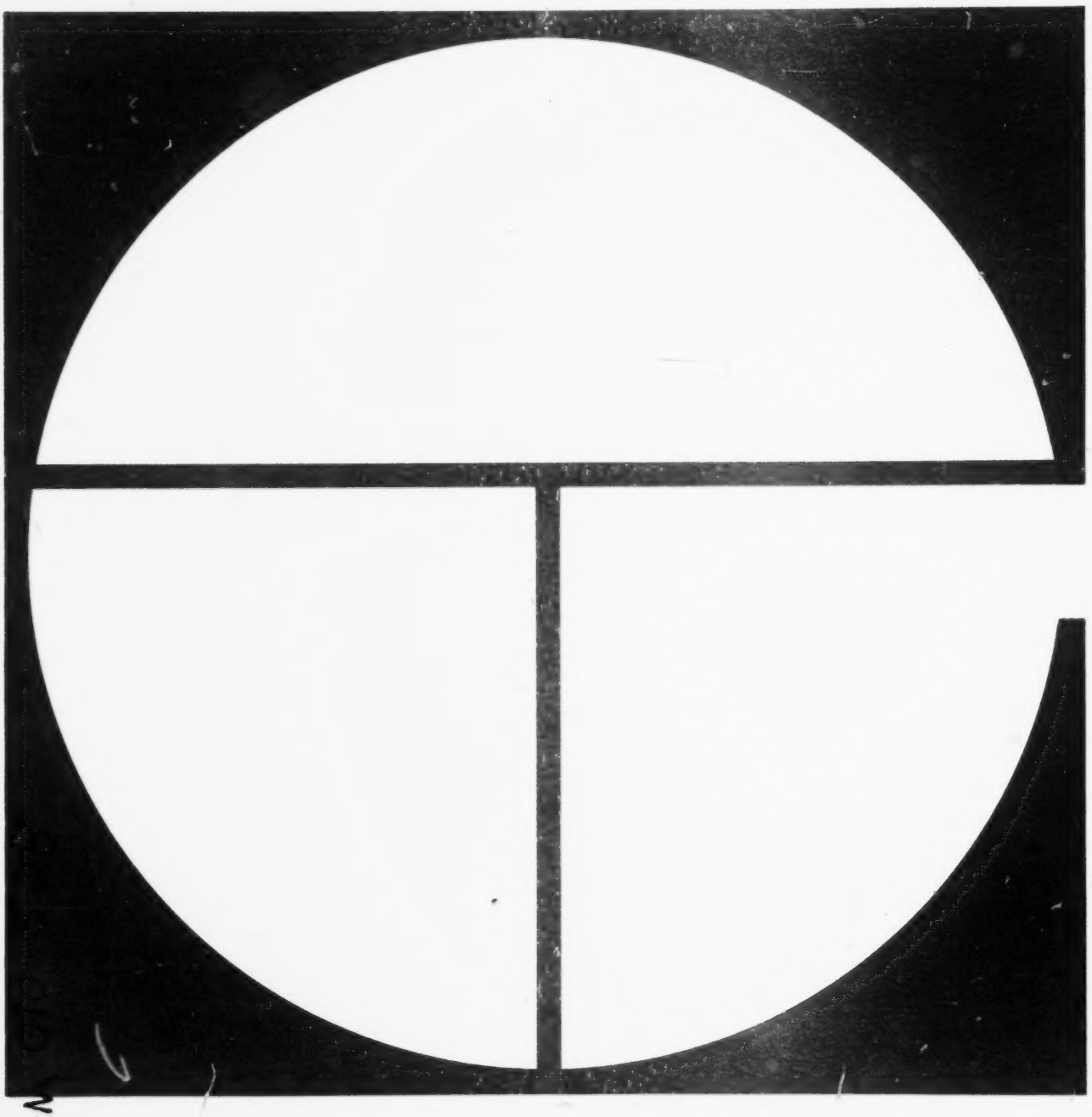
FLORIDA STATE UNIVERSITY / COLLEGE OF EDUCATION / CENTER FOR EDUCATIONAL TECHNOLOGY

ANNUAL REPORT GRANT NO. AID/csd-2945 MAY 1971 through JUNE 1972



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CENTER FOR EDUCATIONAL TECHNOLOGY

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FLORIDA STATE UNIVERSITY

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ANNUAL REPORT

Grant No. AID/csd-2945
May 1971 - June 1972

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I. REPORT SUMMARY

SUMMARY

Title: A Grant to Strengthen at the Florida State University its Center for Educational Technology

Grantee: U.S. Agency for International Development

Director: Robert K. Branson

Period of Grant: May 1, 1971 to June 30, 1976

Narrative Summary:

Under this Grant, the Florida State University committed itself to the strengthening of the University's capacity in applying a systems approach to the utilization of technology in education; to mobilize and extend further its competencies in this field; and, through its Center for Educational Technology (CET), to provide a special focus of its institutional capabilities and resources on the problems of education in developing countries. Specific objectives to be supported by the Grant are: (a) to plan and carry out a program of applied developmental research, (b) to design and organize systematic approaches, alternative models, and optional arrangements for the application of educational technology, (c) to provide educational and training opportunities for U.S. and foreign personnel, (d) to develop an information center on educational technology, (e) to establish interinstitutional linkages with appropriate organizations in developing nations, and (f) to serve as a basic intellectual resource center within the United States.

Significant Grant related accomplishments during the first year of operation are summarized below. Detailed explanations, evaluation, and the relevance of these accomplishments to the program objectives will be furnished in the body of this report:

- An Executive Advisory Council and an International Advisory Council were established, both functioning to guide program definition and development.

- Appropriate physical space was acquired to provide centralized facilities for the Center, including office, library, and media production, demonstration, and training areas.

- During the first year, eight new professional and four staff positions were established.

- A Technical Information and Materials Library, under the guidance of a full-time librarian, has been established. This facility coordinates the acquisition and dissemination of relevant materials on educational technology and CET publications including research reports, programmed instructional materials, annotated bibliographies, and training project reports.

- The design and acquisition of materials and equipment for establishment of a modular multimedia demonstration and training facility is underway. This facility is unique in that it offers several alternative media systems, all of which emphasize cost-effectiveness production.

- A variety of training programs have been designed for U.S. and foreign personnel, ranging from formal degree work to short-term workshops. The major portion of the short-term training has been administered through the CET multimedia workshops, supplemented by special seminars and supervised study. In addition, the Center supports approximately 15 graduate assistantships each quarter, through which students receive guidance for internship activities in the area of educational technology.

- Interinstitutional linkages and liaison relationships have been established with AID missions, Ministers of Education, universities, institutions, international organizations, etc., in Latin America, Asia, Europe, Africa, and the Near East.

- More than 20 short-term bilateral and multilateral consulting activities were engaged in during the year by CET members and faculty associates. In addition, the Center received over 50 visitors, half of whom were from foreign institutions and organizations, the others representing U.S. institutions and various divisions of AID.

- Dissertation research by doctoral candidates has been Grant supported in several cases where such research was directly related to the objectives of the program. Much of this research is now being implemented by graduates engaged in developmental work.

- The Center staff has defined selection criteria for determining which developing countries have suitable conditions for affecting educational change through technology.

- Under non-Grant supported AID contracts, intensive research, and planning for the application of that research, has been done in Korea by Center staff and associated members. Grant supported technical assistance for the implementation of those research findings is now underway in Korea.

The previous statements of accomplishments are not intended to be an exhaustive listing but rather to reflect a series of institutional efforts which have been both stimulated and supported by the Grant. Their significance is relative to their being essential first steps toward a soundly conceived long-range effort to solve developmental problems in education through the application of educational technology techniques. Much has been learned during this first year of operation, and with the experience gained, the Center is prepared to move into making more significant, measurable contributions to the areas of research, service, and training.

II. GENERAL BACKGROUND AND PURPOSE OF GRANT

GENERAL BACKGROUND AND PURPOSE OF GRANT

Concerned political leaders throughout the world see education as a necessary condition of national development. Virtually all multinational educational, cultural, and social organizations actively promote the concept of universal primary education principally supported with public funds. An analysis of the differences between that which has been legislated and that which has been executed defines, at least in part, the massive problems faced by those who work to improve the quality of life for the majority of the world's citizens who live, at best, a marginal existence.

Relatively inadequate educational systems exist in all nations. Unfortunately, the inadequacy is far more dramatic in developing nations with limited financial and human resources. Further, annual population growth makes it necessary to achieve significantly higher educational outputs from existing resources in order to maintain the status quo. And, political pressures for education to contribute to the overall development of the nation, as more and more opportunities are made available, create seemingly insoluble problems when the demand is compared with the opportunity.

Perhaps more important than specific solutions to these problems is the need for a methodology or approach which would serve as a basis for responding to, planning, and implementing educational systems that could be adapted rapidly to the specific educational and manpower needs of developing nations.

An important new area where such an approach is being defined is that of educational technology, including educational systems analysis and development. Features of this area which appear to be responsive to the needs of developing countries are the emphasis on increased learning, different distributions of resources, utilization of various mechanical devices, new output measurement procedures, systems analysis, and cost-effectiveness analysis.

The Florida State University has been engaged in the development of research and training in a systems approach to the application of educational technology since 1968, during which time emphasis has been placed on the hiring of faculty and staff with capabilities and interests in this area. Activities dealt primarily with domestic educational problems. Because of the previous years' work and increasing efforts to expand to international dimensions, the 211(d) Grant has greatly accelerated the ongoing development of the capability and competence

of the University to contribute significantly to assessing, developing, and applying the potential of educational technology as a possible cost-effective means for alleviating certain of the pressing educational problems of developing countries.

The principal activities of the Grant are executed by the Center for Educational Technology. To help ensure a continuing focus on real issues, an International Advisory Council was established which provides input from foreign governments and institutions, Florida State University, and other U.S. universities and institutions. The activities of the Center enable the University to be of greater service to AID, developing countries, and a multiplicity of international public and private institutions and organizations.

III. STATEMENT AND REVIEW OF GRANT OBJECTIVES

STATEMENT AND REVIEW OF GRANT OBJECTIVES

Based on the first year's operations, the objectives as stated in the Grant document remain essentially valid. Minor modifications in terminology, as well as relative emphasis and generalized degrees of accomplishment are stated below regarding each objective.

A. *To plan and carry out a program of applied developmental research in the subject area which is designed to integrate present knowledge and work toward closing knowledge gaps in the field.*

Activities at the Center during the past year have been directly concerned with two approaches. First, to review and analyze existing relevant literature, and second, to study the implications of that work for development. Emphasis on this objective will continue and, as opportunities become available for the application of these research findings, they will be actively implemented.

B. *To design and organize systematic approaches, alternative methods and optional arrangements for the application of educational technology under the differing circumstances and interests of the various developing countries.*

Three areas of emphasis have been identified during the past year. First, the preparation of theoretical and practical technical papers in the general area; second, the analysis and specification of media systems; and third, the design and installation of a media system featuring low-cost components with great flexibility. Specialists from developing countries have been most interested in obtaining additional details and technical assistance in adapting this design to their own situations. This objective will continue to receive program emphasis.

C. *To promise educational and training opportunities for a broad spectrum of U.S. and foreign personnel, ranging from complete advanced degree work to short-term training for a variety of special purposes.*

A large number of students and functionaries from developing countries have availed themselves of the training offered at the Center. The major efforts of the staff have been to identify and provide training opportunities on the FSU campus, and to develop

advanced training programs at the Center for a wide variety of purposes. Future efforts on education and training opportunities involving increased University participation will be an important feature of the program.

D. To develop an information center on educational technology which will be a library of significant research from throughout the world, books and relevant documents as a basic intellectual resource for a variety of purposes.

In order to make this objective more precise, it has been revised as follows:

> To develop an information center on educational technology through the acquisition and dissemination of books and relevant documents to serve as a library of significant research collected from throughout the world.

The Center's library is fully operational, however, greater attention will be directed in the coming year to focusing on determining and securing the specific types of information and materials which will make this a resource of more significant value, both on campus and to specific programs of educational development overseas.

E. To establish strong and mutually reinforcing relationships with the growing number of national and international institutions, organizations, activities and projects involved in educational technology for the developing countries.

A great deal of effort has been and will continue to be directed toward this objective. Extensive staff correspondence, travel, and discussions with representatives of developing nations occurred in the past year aimed at establishing interinstitutional linkages. Efforts are now being concentrated in cooperatively defining and agreeing upon specific linkage activities. These linkages appear to be a most fruitful way to disseminate information and techniques in educational technology.

F. *To serve as a basic intellectual resource center within the U.S. which, through its increase in competence facilitated by this grant and other resources, will be better able to undertake a variety of research, planning, consulting and other performance tasks required by AID and the various other entities involved in the subject area.*

As the capabilities and resources of the Center have been identified and expanded during this first year, there is considerable evidence that FSU is being and will be called upon to serve in particular performance tasks requested by AID, developing countries, and other entities involved in the subject area. The Center will continue to emphasize the development of its ability to respond with appropriate services, but during the second year it will attempt to define more closely long-range goals and areas of continuing input.

IV. ACCOMPLISHMENTS

A. *To plan and carry out a program of applied developmental research in the subject area which is designed to integrate present knowledge and work toward closing knowledge gaps in the field.*

● The Center has initiated a program of analytical and developmental research which will be expanded in succeeding years. The major emphasis of this program is placed on the integration and application of present knowledge. That is, Grant funds are not being used to repeat research which has already been done. What is being pursued is a search for promising approaches and techniques which have already been developed and an in-depth review of these in our training programs with foreign participants in order for them to grow accustomed to applying existing knowledge in educational technology without waiting for future research. However, additional efforts are being directed toward those areas where no significant research has yet been produced.

● Efforts are being directed toward identifying, defining, and establishing priorities of educational problems and needs of developing countries by geographic region. Data sources include on-the-spot assessments made by CET personnel in the field through interviews with key people, as well as interviews with experienced U.S. and foreign visitors to CET, and reviews of relevant research projects, programs, and reports. (See Interinstitutional Linkages, p. 60.)

● Several FSU graduate students receiving CET assistance have produced dissertations which provide relevant research in this area. Abstracts for each of these dissertations may be found in the Annex to this report:

Sprague, David M. *An Empirical Investigation of the Relationship Between Media Preference and Learner Performance.*

Srisopa, Anan. *Methodology for Forecasting Manpower Requirements as a Basis for Long Range Educational Planning.*

Restrepo, Bernardo. *A Study of the Effectiveness of Individualized Instruction and Flexible Schooling as Compared to Conventional Instruction and Traditional Schedules of Schooling in Colombian Rural Education.*

- The Center is striving to develop selection criteria for determining which developing countries or regions have the most suitable conditions for bringing about educational change through technological applications.

- Initial research has begun in the general area of reducing the cost involved in the production of learning modules in various media. Analysis of programming and production procedures at a number of locations throughout the world has revealed a practice of general adherence to the entertainment model of TV production. Often, if not always, these procedures increase production costs and delay the start dates of feeding or broadcasting signals. Two major ongoing efforts in this area are the accumulation of a variety of media hardware which gives the most flexibility and alternatives in terms of cost (see Multimedia Lab, p. 33), and the development of a series of multimedia workshops which provide hands-on training in the production of inexpensive programmed instructional materials. To date the sections of the workshops which have been completed and implemented are program design, development of P. I. texts, and the production of single-camera student response I-TV modules. To be completed by January 1973, are the audio-tutorial and slide/tape sections. (See Multimedia Workshops, p. 39.) These workshops undergo constant revision on the basis of the performance of CET's project participants and the needs of the specific groups involved in the training programs.

B. To design and organize systematic approaches, alternative methods and optional arrangements for the application of educational technology under the differing circumstances and interests of the various developing countries.

● CET has designed a systematic approach to applying educational technology in developing nations. This approach has been defined in a CET publication entitled "Educational Technology in Developing Countries: A Systems Approach." This article has been translated into Spanish and submitted for publication in *Teleducacion*. The basic elements of the approach are as follow:

The Center for Educational Technology approaches the problems of developing nations recognizing that their solutions will be a long term effort. Generally, three major steps are specified for educational development:

1. Initial consulting and technical assistance activities.
2. Training on three levels: Short term programs for technicians; intermediate term programs to prepare managers and professionals; long term academic programs to prepare Ph.D.'s.
3. Development of interinstitutional linkages.

Details concerning these steps and further considerations that are involved in this approach are explained in Section V, page 30.

● Dr. Clifton Chadwick refined a general approach for the development of educational technology in Latin America while studying at CET under 211(d) Grant support prior to an assignment in Argentina by the OAS. This work is reported in the abstract of his dissertation entitled, *A Systems Analysis and Design for the Development of Educational Technology in a Developing Country: The Case of Argentina.* (See abstract in Annex.) Dr. Chadwick is currently working in Argentina as an OAS technologist, in which position he is able to further refine the approach he began while at CET.

● Jaime Lozano and Manuel Rubio, CET participants in an OAS project, have produced a paper entitled "Closed-Circuit Television and TV Studio." It presents an organization and suggestions for optional arrangements for the development of closed-circuit educational TV. This is especially relevant information for developing countries that are initiating the use of TV in their educational systems because it provides a cost-effectiveness base for planning. All of the stipulations presented are based on the most current technological developments.

● Krisna T. Kumar, a CET associate, has defined an approach to the construction of optimal educational policy design. It is anticipated that CET will publish and distribute the paper in which this design is documented. (See abstract in Annex.)

● CET's Multimedia Lab emphasizes flexibility in the application of educational technology through the use of modular equipment. It provides a good example of an expandable system which offers great adaptability for the use of technology in educational settings. Therefore, it can offer satisfactory alternative models for developing nations with limited resources. (See Multimedia Lab, p. 33.)

● The publication and distribution of *Systems Analysis for Educational Change: The Republic of Korea* is a 211(d) funded activity which provides, in print, information on a current application of educational technology in Korea. Therefore, it serves as an alternative example to be used as reference for similar activities in other developing countries. The writing and research efforts of the report were funded by sources other than 211(d).

C. *To promise educational and training opportunities for a broad spectrum of U.S. and foreign personnel, ranging from complete advanced degree work to short-term training for a variety of special purposes.*

Many of the Center's resources have been directed toward the development of educational and training opportunities to serve the needs of AID, developing countries, and other interested U.S. and foreign personnel. There are three types of training programs that are offered:

I. Specialized instructional programs and workshops in educational technology.

- Fourteen seminars were presented to CET participants and staff during the past year. The seminars, covering a variety of subjects dealing with educational technology, were presented by invited foreign and U.S. educators, technologists, and administrators. (See p. 37.)

- The development of CET's Multimedia Workshop is currently underway and comprises a major part of CET's training activities. It consists of six specific workshops ranging from program design through hands-on media production and evaluation. These workshops vary in duration from a few days to several months. They are designed to enable the learner to:

  Use the systems approach to design, produce, and evaluate a programmed course of instruction in the following media:
  Programmed Instruction Text
  Audio-Tutorial
  Slide/Tape
  Basic I-TV
  8mm Motion Picture

  With these units, programs can be tailored to the needs and interests of the participants. That is, the workshops can be presented separately or in almost any combination. (See p. 39.)

- Six projects were conducted this past year which employed intensive training in specific sections of the Multimedia Workshop, depending upon the particular needs and interests of the participants in each project. (These are reported on p. 50.)

II. CET training programs supplemented by formal FSU course work.

- For those participants who desire training in a variety of skills, FSU course work is taken to supplement the specific skills being learned in CET workshops. Courses may be selected from several colleges and departments for an interdisciplinary program, but the majority of the courses are usually selected from those offered by the College of Education's Department of Educational Research and Testing, and Educational Administration. (A Course Listing is given in Section V, p. 53.)

- The Computer Assisted Instruction (CAI) Center provides significant formal supplementary training for CET participants. Two courses offered via CAI facilities that are particularly relevant to CET programs are "Techniques of Programmed Instruction" (EDR 537), and "Computers in Education" (EDR 536). Both of these courses are taught by computer-managed instruction and self-study. This gives trainees an excellent opportunity to learn about the use of computers in education while at the same time gaining first hand experience in the techniques involved. The CAI Center also offers informal seminars and tours for CET visitors. (See p. 57.)

III. Master's and Doctoral degree programs supplemented by research activities under the supervision of CET.

- Approximately sixteen foreign students were involved in formal degree programs during the past year. These students participated in applied supervised research activities developed for them by CET, and for which they received course credit. For those whose interests were related to another area of education, such as Adult Education, activities were sought under the guidance of the specific department where possible.

- CET also provides graduate assistantships for non-CET students in order to provide internship activities for those interested in educational technology.

Preliminary planning has begun for the design of a program to teach English for the specialized purpose of studying educational technology. This will serve as a supplementary remedial program for those foreign students who have deficiencies in English to the extent that their training is impaired. This program could serve as a model to other institutions and agencies with similar problems in training foreign students.

D. To develop an information center on educational technology through the acquisition and dissemination of books and relevant documents to serve as a library of significant research collected from throughout the world.

The collection and effective dissemination of information on educational technology which could be useful to educators, planners, and governments is an important responsibility of CET. Several projects are currently underway to strengthen this capability:

- The central activity was the establishment of CET's Technical Information and Materials Section in September 1971. This facility is staffed by a full-time professional librarian and contains books, journals, and research reports on educational technology and other related subjects. Particular emphasis is being placed on the collection of information and materials relating to the application of educational technology in developing countries. In addition to its dissemination function, the facility serves as an effective resource base for research, development, planning, instruction, and evaluation activities carried on by the Center. (See p. 58.)

- The development of annotated bibliographies addressing various aspects of educational technology is underway. Already completed and soon to be available are those covering Educational Radio, Adult Education, Minority Education, and Programmed Instruction. Near completion is one on Educational Evaluation. Others will be developed in conjunction with CET programs and demands from the field.

- Copies of reports on all CET project and research activities are kept as future references for work in the specific area to which each applies. Also on file are dissertations that have been written by students receiving CET assistance and/or guidance.

- The Center has established the capability to translate informational and technical articles into Spanish and Portuguese (and shortly French), which should increase the number of potential users of its dissemination services.

- CET maintains close contact with the AID supported Regional Technical Aids Center in Mexico City for the purpose of informing the RTAC staff of recent American publications worthy of their consideration for arranging publication in Latin America. Over the past year a number of titles have been published in Latin America based on recommendations made by CET.

- The CET Multimedia Lab is involved in reviewing, selecting, and acquiring representative samples of multimedia programmed instructional materials from those currently available on the market. These will be used for familiarizing visitors to the Center with various kinds of programmed materials and as reference materials for CET training.

- Another activity of the Multimedia Lab consists of cataloging all currently available educational equipment and devices by type, manufacturer, capability, level of sophistication, quality, cost, and other relevant factors. This library of educational hardware will be useful to those who have a limited budget and want to consider trade-offs among numerous factors with an eye toward maximizing capability per dollar cost. It can also be used for simply familiarizing people with what is available in the way of educational equipment and devices. (See Multimedia Lab, p. 33.)

E. To establish strong and mutually reinforcing relationships with the growing number of national and international institutions, organizations, activities and projects involved in educational technology for the developing countries.

In assisting developing communities and countries to improve their educational programs through systems planning and technological applications, it is necessary for CET to place heavy reliance upon on-site institutions and people. For this reason, a major function of CET is the development of linkages and liaisons with institutions and people in various regions and countries around the world. Experience to date has shown that these interinstitutional linkages are serving to facilitate effective interchange and implementation of educational research findings. (Details given in Section V.)

● CET has established an approach to making its liaisons and linkages. Through personal contacts and exchanges of information we determine if there is a mesh between CET and that institution that would be of mutual benefit. Normally a liaison contact is established first. If it is determined that more involvement in the form of a linkage is desirable, three conditions must then be met by the developing country: (1) The designation of an institution to implement new policies. (2) A commitment must be made by officials who have authority to establish a policy statement for the particular institution or agency involved. (3) Allocation of sufficient resources (human and material) to carry out policies. These conditions were established to ensure benefit from the degree of involvement that is necessary in an interinstitutional linkage relationship.

● Major liaisons and linkages which have been established to date are listed below (also, see Figure 1). Descriptions of the nature of CET's activities with each are given in Section V.

LINKAGES

University of Antioquia - COLOMBIA

Ministry of Education, Korean Educational Development Laboratory - KOREA

Ministry of Education, Department of Vocational Education - THAILAND

Ministry of Education, Curriculum Development and Educational Mass Media Center - ETHIOPIA

National University of Zaire and its Center for Interdisciplinary Research in Education, Faculty of Psychology and Pedagogy, Kisangani Campus - ZAIRE

LIAISONS

Ministry of Education - PANAMA

Catholic University, Center for Educational Media for Development - PERU

National Institute for Research and the Upgrading of Teachers - PERU

Instituto de Pesquisas Espaciais - BRAZIL

Ministry of Education, Basic Village Education Project - GUATEMALA

Ministry of Education - EL SALVADOR

Korean Institute for Research in the Behavioral Sciences - KOREA

The Southeast Asian Regional Center for Educational Innovation and Technology - SINGAPORE

American University of Beirut - LEBANON

Ministry of Education - UGANDA

Ministry of Education, Kakata Rural Teacher Training Institute - LIBERIA

Institute of Educational Sciences - TUNISIA

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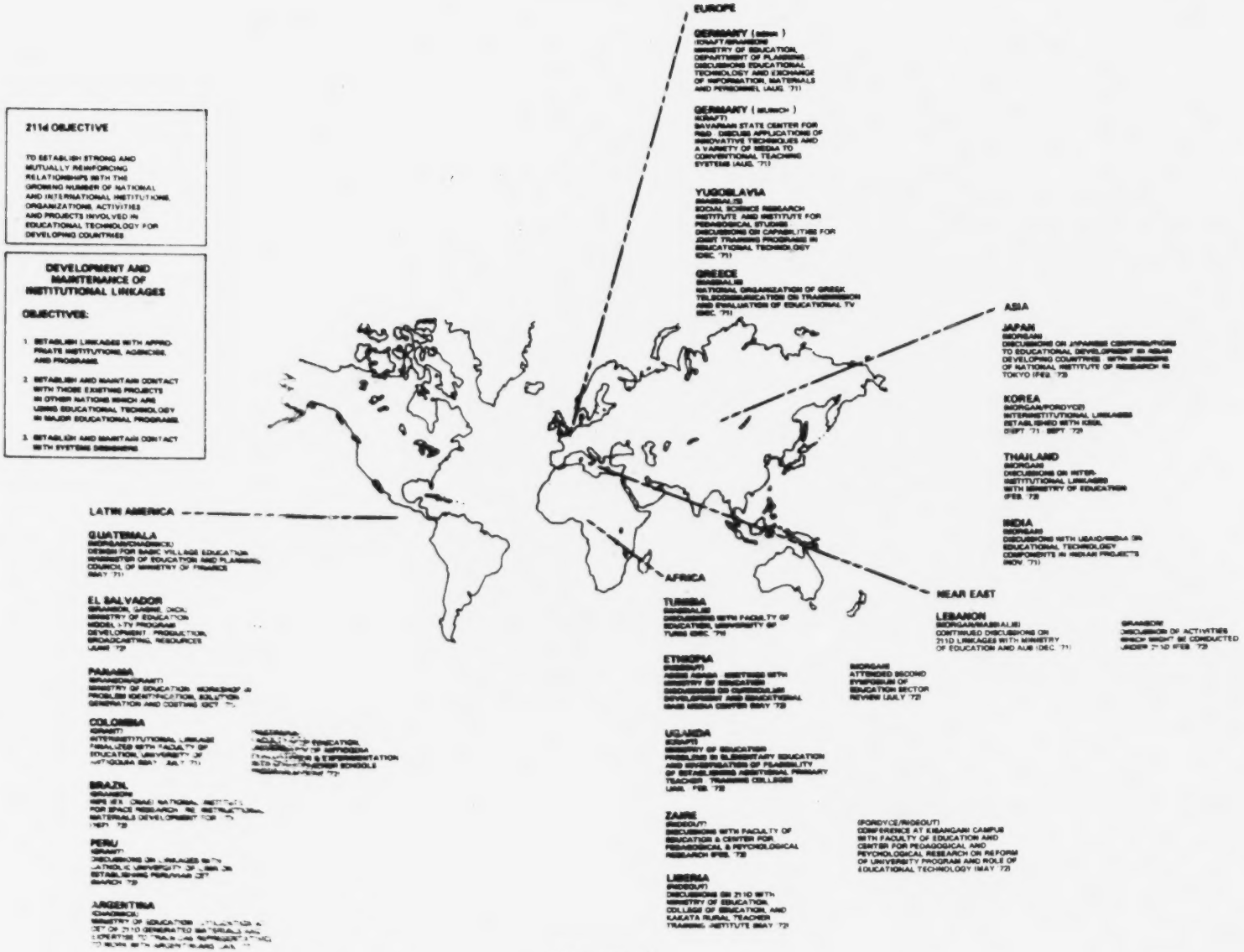
211d OBJECTIVE
TO ESTABLISH STRONG AND MUTUALLY REINFORCING RELATIONSHIPS WITH THE GROWING NUMBER OF NATIONAL AND INTERNATIONAL INSTITUTIONS, ORGANIZATIONS, ACTIVITIES AND PROJECTS INVOLVED IN EDUCATIONAL TECHNOLOGY FOR DEVELOPING COUNTRIES
DEVELOPMENT AND MAINTENANCE OF INSTITUTIONAL LINKAGES
OBJECTIVES:
1. ESTABLISH LINKAGES WITH APPROPRIATE INSTITUTIONS, AGENCIES AND PROGRAMS.
2. ESTABLISH AND MAINTAIN CONTACT WITH THOSE EXISTING PROJECTS IN OTHER NATIONS WHICH ARE USING EDUCATIONAL TECHNOLOGY IN MAJOR EDUCATIONAL PROGRAMS.
3. ESTABLISH AND MAINTAIN CONTACT WITH SYSTEMS DESIGNERS
EUROPE
GERMANY ( )
GERMANY ( )
YUGOSLAVIA
GREECE
ASIA
JAPAN
KOREA
THAILAND
INDIA
LATIN AMERICA
GUATEMALA
EL SALVADOR
PANAMA
COLOMBIA
BRAZIL
PERU
ARGENTINA
AFRICA
TUNISIA
ETHIOPIA
UGANDA
ZAIRE
LIBERIA
NEAR EAST
LEBANON

Figure 1.

F. *To serve as a basic intellectual resource center within the U.S. which, through its increase in competence facilitated by this grant and other resources, will be better able to undertake a variety of research, planning, consulting and other performance tasks required by AID and the various other entities involved in the subject area.*

All of the aforementioned accomplishments have contributed toward establishing CET as an intellectual resource center. Because of the wide variety of activities undertaken, a broad range of expertise is being developed. Therefore, CET is continuing to increase the scope of services and tasks it can perform for AID, developing countries, and other interested entities.

- The expertise of the staff provides the core of CET's intellectual resources. A broad spectrum of multidisciplinary skills are represented. (See Vitae in Annex.) To increase the range of competence, CET enlists the services of other faculty members from many departments within the University. A roster has been compiled of the College of Education faculty who have expressed an interest in participating in CET activities.

- CET has an Executive Advisory Council comprised of members of the College of Education faculty. This council assists the Director in establishing policy for the Center.

- The International Advisory Council serves as a significant resource for acquiring timely information on educational problems facing developing countries. The international spectrum of expertise held by council members aids in channelling CET activities into relevant areas and in maintaining contact with officials of foreign countries and institutions. The Advisory Council includes members of foreign governments and institutions, the Agency for International Development, Florida State University, and other U. S. universities and institutions. (See p. 79.)

- Through its personnel resources, CET is able to undertake a variety of consulting activities. Perhaps the most significant of these are those involved in the establishment and maintenance of interinstitutional linkages and liaisons. (See p. 75.)

- Short-term consultations are engaged in with U. S. and foreign educational organizations for purposes such as discussing the role of educational technology for specific problem-solving tasks, and establishing information and publications exchange (other than in interinstitutional linkage and liaison relationships).

● During the first year of operation the Center had many visitors from U.S. and foreign institutions. Each visitor is given a tour of the Center and a briefing of its activities, accompanied by discussions of problems the visitors have been experiencing in their respective countries and/or institutions. (See Annex.)

● CET's Multimedia Lab acts as an intellectual resource in several ways:

This facility is assembling a library which consists of manufacturers' descriptions and technical information on equipment available in the field of educational technology.

The demonstration and production facility provides concrete samples of a wide range of currently available equipment. Technical descriptions and cost figures are available to prospective users of this type of equipment.

The technical staff is available to assist in the planning, design, and selection of equipment for educational technology systems of varying degrees of complexity.

The media personnel assist in training programs which involve multimedia systems design, materials production, and presentation techniques.

The development of technical prototypes is an integral part of the Multimedia Lab's objectives. Blueprints of prototype media carrels which have been developed by the staff are available for interested individuals and institutions.

The Center's Demonstration/Learning Lab served as the basis for the design of a multimedia lab facility for the present College of Education building at FSU, and this installation is to be completed in the next few months. This facility will be used cooperatively by all departments within the College.

The media staff assisted in the design of the proposed multimedia Production/Dissemination System for the new College of Education complex at FSU to be completed by 1975-76.

V. IMPACT OF GRANT SUPPORTED ACTIVITIES IN DEVELOPING INSTITUTIONAL CAPABILITIES

A. *To plan and carry out a program of applied developmental research in the subject area which is designed to integrate present knowledge and work toward closing knowledge gaps in the field.*

In the original proposal from Florida State University to AID and in the Grant document itself specific mention is made of the selection and isolation of priority research areas which will be pursued by the University over the next several years. Efforts during the past year aimed at the identification of specific areas of research have led to two general conclusions: (a) that the information most needed deals with the problem of the interface between the student and the learning system itself. That is, do alternative delivery systems produce identical or comparable results, and (b) a truly vast amount of research has already been done, the results of which have not been systematically incorporated into the design of new educational systems.

It almost seems that some research is being done for the sake of research. While this is a critically important practice in the area of pure science, it does not represent a particularly fruitful way to approach a group of specific applied problems. A definite program should be identified and specific problems within the program capable of research solutions need to be formulated so that the research solutions will have a direct bearing on the project at hand. While it seems trite to state that research in the general area is uncoordinated and much of the available information is not widely used, this seems to be the case.

For example, in the El Salvador educational television system, specific criteria have not been developed which would aid in deciding when a television lesson should be revised. Often, it appears that revisions of programs are undertaken for aesthetic rather than performance reasons. It is difficult to see how additional research in this area would lead to changed practices. A more useful approach to this problem would be the application of existing knowledge in the design of criteria to be used for program revision. To accumulate more research data before methodologies of applying that data have been improved, is, perhaps, an inappropriate use of funds.

The greatest lack of relevant research is probably in the area of media production techniques. At the Center, initial research has begun in the general area of reducing the cost involved in the production of learning modules in various media. Almost all broadcast media and motion picture production methodology has come into the field of education from commercial broadcasters and film

makers. Many textbooks and manuals on television production, radio production, and film making have been written by people thoroughly experienced in the entertainment business. There is reason to believe that the production techniques used in broadcast media, while completely appropriate for the entertainment business may not be appropriate for education.

For example, almost any "bible" on television production lists the separate functions to be performed by a number of specialists prior to the time that the program is actually taped. The processes of writing, scripting, storyboarding, blocking, and filming or taping are well set forth. But the production procedures used are those which articulate a variety of specialties within the entertainment industry, each of which has its own regulatory guild or union. There are those who write stories, those who write scripts, those who make storyboards, those who direct, and those who act. Often, procedural techniques from commercial settings are developed to minimize the use of the most expensive talent which, in the case of commercial television, is often the artist who does the acting. On the other hand, in education, to follow rigidly and blindly these same procedures may limit the potential output. That is, since it is possible in an educational production to use the "teacher" as the writer, the scripter, and the actor, it is not necessary to go through all of the procedural steps required in commercial production.

If it is possible to reduce the many unnecessary steps and rituals that have been brought over from commercial production into educational production, then it will be possible to increase the output of educational media centers as well as reduce their costs of operation. A second possibility is the use of existing film, video tape and broadcast radio tapes in the ad hoc programming of specific topics. One example of this approach has been provided by Neil Hurley in his recent *Theology through Film*. In this book Father Hurley has described incidents, themes, and other events in existing widely distributed films and has shown the relationships of those to the central theme of theology. He also provided many provocative questions about specific topics.

These approaches, which are referred to as adjunctive programming, can considerably reduce costs in production. While initial steps in the development of these procedures have been rewarding, only time will allow a more definitive conclusion as to their appropriateness in education.

In summary, the general approach at the Center has been to seek low cost methodology and low cost equipment in an attempt to bring

down the general cost of operation for media centers and yet provide quality production. Since most developing nations have ways either to borrow or to receive gifts of capital costs, the most severe problem seems to be in methods which will allow them to diminish operating costs. If such plans are not laid down in advance, they often produce unsatisfactory results.

B. *To design and organize systematic approaches, alternative methods and optional arrangements for the application of educational technology under the differing circumstances and interests of the various developing countries.*

CET'S APPROACH TO THE APPLICATION OF EDUCATIONAL TECHNOLOGY

As educational problems in developing countries intensify, more and more people are turning to the application of educational technology with the singular hope that the problems they face can be solved through technology. The intensity of the problem increases the need for more immediate solutions but in no way provides an adequate means to solve the problems. The point is, no matter how intense the need, it does not by itself provide a solution regardless of the resources available.

In spite of the immediacy of the problems, economic and social development through education is a long term process. Often, the long term nature of reasonable solutions requires that they be shelved in the interest of short term panaceas. Many times, developing countries have acquired and deployed technologically based systems, television, and other hardware only to find that no impact was made on the major problems at hand.

CET's efforts are devoted primarily to the application of educational technology in developing countries. A variety of professional skills are employed in large scale problem solving efforts. Many disciplines and skills can be brought to bear on the educational problems of a specific nation.

While there are no universal solutions, there are a number of general principles which can be brought to bear on the problems. More specifically, the problems at hand are generally brought about due to a failure of the existing educational system in a developing country to satisfactorily serve the population currently attending school. That is, many students in attendance do not profit from the instruction offered. Governments of developing countries have, during the past two decades, become concerned about the educational opportunities offered to all of their citizens. Consequently, laws have been passed requiring free primary education to all citizens. The facts are that population increase and archaic methodology combined do not readily permit the realization of the intent of the laws.

CET approaches the problems of education in developing countries recognizing that their solutions will be a long term major effort. Generally, three main steps are specified for educational development: (1) Initial consulting and technical assistance activities resulting in a careful problem analysis and a proposed solution or set of alternative solutions to the educational problems. The solutions proposed must, by principle, be cost feasible, culturally acceptable, and, on the basis of the best estimates available, provide realistic alternative solutions to the problems. (2) Once the problem has been carefully analyzed, training is offered to those individuals charged with the responsibility of implementing the problem solution. The training takes place on three levels: short term, specially prepared training programs for technicians; intermediate term programs to prepare managers and professionals in instructional and educational technology; long term academic programs to prepare Ph. D. 's in educational technology so that new research and development activities can be carried on in the developing country by its own citizens. (3) Development of interinstitutional linkages with selected institutions in developing countries. The purpose of the linkages is twofold: to serve as a center which will attract a critical mass of talent capable of analyzing and proposing realistic solutions and improvements to the educational system in the country itself; to serve as a center which can disseminate information about educational technology to other interested parties in the geographic area at hand.

The articulation of each of these activities is a necessary condition for success in the application of various kinds of educational technology. The Center has a limited number of professionals available to do work in the various areas, therefore it must of necessity select those countries with which it will establish a long term relationship. Since there are no short term solutions to educational problems, it must be recognized by both the professional staff of the Center and the representatives of the country seeking assistance that a long term relationship is required in order to produce satisfactory results.

It should be emphasized here that CET does not favor the approach of sending large teams into another country for the purpose of doing work that local nationals can and ultimately must do. The major objective of the Center's development programs is the establishment of a capability for complete takeover and operation by host nation professionals of the solutions proposed jointly by the Center and host nation counterparts working as a team.

Historically, many worthwhile projects brought about through technical assistance to developing countries have found themselves in a state of decay on the day of the withdrawal of the technical assistance

professionals. Since it is easier to do the work than to train others to do it, these projects have decayed when the principal proponents withdrew. In order to avoid project decay problems, the Center recommends training the host nation professionals before implementation of major projects. Simply, this means that the project implementers (counterparts) are brought to Florida State University for training prior to the implementation of a major project. This simple reversal of the training and implementation cycles makes it possible for host nation professionals to gain control of the program much earlier than would ever be possible otherwise.

A second consideration that is generally lacking in large scale projects is evaluation. The Center follows two major evaluative schemes: (a) formative evaluation techniques employed from the beginning of the project, and (b) summative evaluation techniques to determine whether the project achieved its intended objectives.

Earlier it was stated that any proposed solutions to education problems of developing countries must be cost feasible. The general definition for cost feasibility used by the Center is that the unit cost of education must be reduced if the population is to be served. It is not possible to serve the total age eligible population without reducing the cost currently expended on each member of the existing school population. The realities of finance make this statement true, regardless of whether it is desirable or undesirable.

The three main sources of project failure are confronted head-on in programs offered by the Center. Projects should not fail because of inadequate training of counterparts. Projects should not fail because they are economically naive. Projects should not fail because the proposed solution is inadequate to meet the problems of education in the country.

In order to meet these three criteria, careful analysis of educational problems must be undertaken prior to the implementation of any proposed solution. Often, investment in education must be defended on a strictly economic basis. This means that the rate of return on investment for manpower development activities must be equal to or greater than the rate of return on other investments. Simply stated, investment in schools, teachers, and educational equipment must yield a higher payoff than investment in roads, communication systems, and power. Those nations able to achieve the best balance in investment in the various sectors of their economy will be the nations which achieve the greatest rate of improvement of their developmental level.

CET MULTIMEDIA LAB

The CET Multimedia Lab is an operational element of the Center. It derives its goals from the objectives of the 211(d) Grant and the policies of the College of Education. The mission of this facility is to support the Center in the systematic design, production, evaluation, and demonstration of new educational systems. This includes:

- applications of instructional media research to the production of prototype instructional modules
- media support for research projects and workshops
- assistance in the development of training programs in media technology for graduate and foreign students
- design and development of new systems for production and delivery of educational software.

The facility consists of an instructional technology demonstration room, a studio, a still photography lab, and an engineering design and maintenance area (see Figure 2). All elements of this facility are directed toward the development of low cost media programming. The physical facility is designed to serve as a model production and dissemination system. (A listing of the equipment in this facility is given in the Annex.)

DEMONSTRATION FUNCTION: The instructional technology demonstration function of the Multimedia Lab became operational in January of 1972. This facility is presently being used for both training and demonstration purposes. It houses a full range of instructional equipment and devices which are arranged in such a way as to make possible not only viewing and response to instruction but also limited production of simple instructional prototypes. The equipment includes: 16mm projection w/magnetic record capability; super 8mm projectors w/magnetic record capability; slide/tape systems; filmstrip projectors; filmstrip cassette projectors; reel-reel audio tape recorders; audio cassette recorders and playback units; video cassette recorder; 1/2 inch video recorders and film-disk and cassette systems. Most of the equipment is capable of allowing for student response. In selecting equipment for this facility, preference was given to devices which offered a viewing/listening capability plus a recording capability in order to increase flexibility and maximize potential utilization of the equipment. In addition to the above, other equipment is available for individual student use away from the Center for a variety of activities from individual study to actual production of instructional prototypes.

The demonstration room is designed to accomodate 15 persons using mediated carrels and an additional 15 persons using the conference/

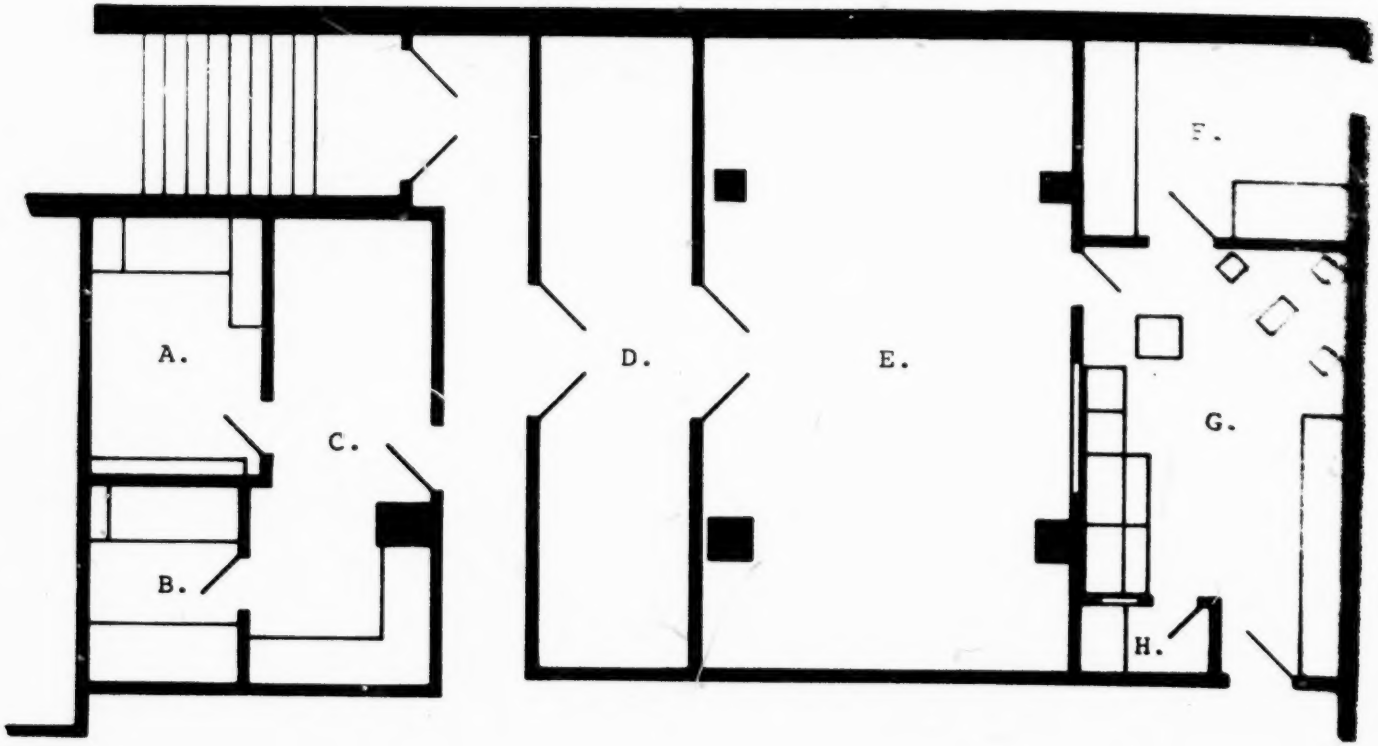

Figure 2.

CENTER FOR EDUCATIONAL TECHNOLOGY
MEDIA FACILITY

A. Coordinator
B. Photo Darkroom
C. Photo Lab.
D. Photo Lab. & Storage
E. Studio/Learning Lab.
F. Engineering Office/Shop
G. Television Control Room
H. Announce Booth
I. Demonstration/Learning Lab.
J. Multi-Media Projection Room

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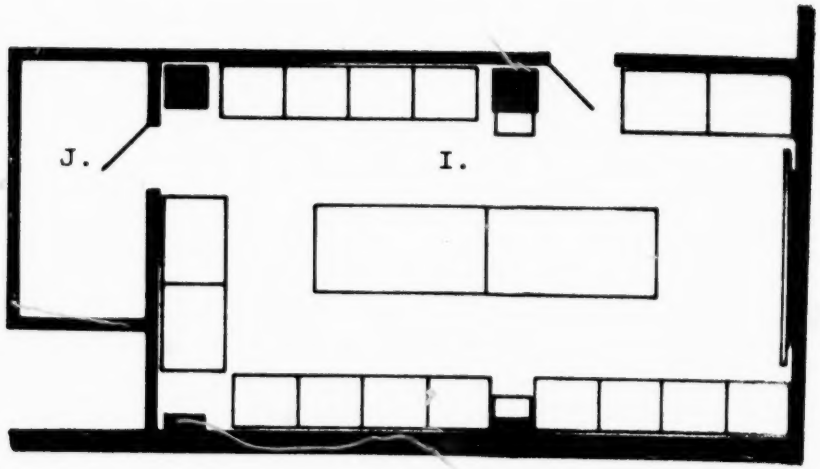

group viewing area, or the room can be converted into a large demonstration or instruction area which will accomodate 35 persons. Attached to the demonstration room is a projection booth which allows for large screen multimedia presentations to groups of visitors and CET trainees. Provisions have been made to allow for the addition of other innovative and useful devices as they become available (e.g., individual student-response system or computer terminals when they are within the economic reach of the Center and judged effective tools of instructional technology). The demonstration equipment is housed in prototype media carrels developed at the Center. Requests for the blueprinted designs of the carrels have been received from organizations within the University and have been honored. In addition, the facility and its equipment have been reviewed by planners of a new College of Education media utilization laboratory for FSU and have strongly influenced the design and equipment configuration of that lab which will be used cooperatively by all of the College's instructional units.

STILL PHOTOGRAPHY LABORATORY: This lab became completely operational in June 1972. It is staffed by one experienced full-time photographer. The facility includes a complete photo-darkroom (see Figure 2) which is equipped with an excellent photo-enlarger with three lenses, necessary timers, safe lights, ventillation system, an automatic processing unit, and a large stainless steel sink with an automatic water temperature control system. Though the darkroom is of small physical dimensions, its efficient layout allows for several people to work together while processing film and making photographic prints. Thus, interested students can gain valuable "hands-on" experience in the production of instructional photographic materials under the supervision of a professional photographer. The equipment in this facility includes a complete range of still photographic cameras and a super 8mm motion picture camera (see equipment listing in Annex). In addition, there are associated items of equipment such as a photo print dryer, a dry-mount press, portable studio lighting kit, and other miscellaneous items.

AUDIO/TELEVISION PRODUCTION/TRAINING SYSTEM: This facility is scheduled for completion in August 1972. It will be one of the most unique aspects of the Multimedia Lab because of its operational flexibility and low cost, both of which make it an ideal model for developing countries or any fledgling system with limited resources. Although the system is housed within a Studio/Learning Lab (see Figure 2) and appears to be rather conventional in terms of function, it is not. Each major element of the system was designed to be completely self-contained and portable with the exception of the film chain and a stationary equipment rack.

This facility is staffed by a full-time electronics engineer whose responsibilities include operation and maintenance of the system, consultative assistance in the design of new systems for developing countries, and training supervision related to systems design and operation.

The physical facility in which this system is housed consists of: a small (17'x30') Studio/Learning Lab which has been acoustically treated; a production control room which contains a small isolated audio announce booth; an engineering office and shop; and a properties storage room. Annotation of the facility's equipment is presented in the Annex.

C. To promise educational and training opportunities for a broad spectrum of U.S. and foreign personnel, ranging from complete advanced degree work to short-term training for a variety of special purposes.

SEMINARS

"A Teaching Management System to Make Learning Happen."
Wesley Becker, Professor of Special Education, University of Oregon.

"In-Service Training Performance of CET's OAS Students in Argentina."
Clifton Chadwick, Educational Technology Specialist, OAS, Buenos Aires, Argentina.

"An Introduction to Educational Technology: Purpose, Future Uses, and Direct Application to Practical Problems."
William Deterline, Deterline Associates, Los Altos, California.

"Derivation of the Systems Approach to Educational Technology."
Walter Dick, Assistant Dean, College of Education, Florida State University.

"Introduction to Competency Based Teacher Education."
Norman Dodl, Associate Professor, Elementary Education, Florida State University.

"The History and Influence of the Military Psychology Programs on Contemporary Educational Technology."
Robert Gagné, Professor, Educational Research, Florida State University (and Virginia Zachert).

"Training and Management Programs in I-TV Being Utilized by UNESCO, United Kingdom, USA, and Spain." and "Major Trends in I-TV in Latin American Countries."
Estela Garland, Konrad Adenauer Foundation, Lima, Peru.

"German Educational Developmental Activities in Latin America."
Werner Handke, German Embassy, Washington, D.C.

"Uses of Satellites in Education."
Ward Haneveld, Abt Associates, Boston, Massachusetts.

"The State of the Art of Educational Technology in Germany."
Klaus Hinst, Executive Director, Curriculum Development and Ministry of Education of Hesse, Wiesbaden, Germany.

"Possible Uses of Satellites in Latin America." and "New Approaches to the Use of Existing Materials in Instruction."
Father Neil Hurley, Institute of Social Communication, Santiago, Chile.

"History of the Development of TV Engineering and Prospects for the Future."
Matthew McGillicuddy, Ampex Corporation, Redwood, California.

"Peruvian Education Reform: The Vertical Curriculum."
Mauricio San Martin, Director of In-Service Education, Ministry of Education, Lima, Peru.

"The History and Influence of the Military Psychology Programs on Contemporary Educational Technology."
(with Robert Gagné) and
"Uses of Educational Technology in a Medical School: Emphasis on Programmed Instruction."
Virginia Zachert, Department of Obstetrics and Gynecology, Medical College of Georgia, Augusta, Georgia.

NOTE: Seminars are usually recorded on audio and/or video tape in order to serve as instructional aids and to increase the resources of current information on educational technology.

CET MULTIMEDIA WORKSHOPS

Once it has been determined, as it has in many developing nations, that much of the instructional burden is to be carried by various instructional media, a twofold problem emerges. First, the materials must be instructionally sound, exemplifying the best practical applications of learning theory. Second, the materials must be designed and produced to cost-effectiveness ratios which correspond to levels of economic development in particular nations. This generates the need for a skill-development program for these countries which encompasses the range of systems approach techniques in instructional materials development.

Specifically, many of the contracts entered into by CET come from organizations in foreign countries representing diverse levels of technological sophistication. They have, as part of their controlling documents, specifications for a "hands-on" training workshop in the application of educational technology principles to the development of instructional materials. One of the crucial problems in this type of enterprise is the scarcity of research information which may be directed to improving the cost-effectiveness factor in selection of media and production of materials.

The CET workshops have therefore been developed to meet the primary requirements of skill-development and research in instructional materials design, production, and evaluation. These workshops are integral elements of the basic objectives of the AID/211(d) contract to strengthen the Center's capability in analytical and developmental research, planning and design, and product development.

OBJECTIVES

The workshop series, as shown in Figure 3, ranges from program design through "hands-on" media production and evaluation, and is designed to enable the learner to:

USE THE SYSTEMS APPROACH TO DESIGN, PRODUCE, AND EVALUATE A PROGRAMMED COURSE OF INSTRUCTION IN THE FOLLOWING MEDIA:

- P. I. TEXT
- AUDIO-TUTORIAL

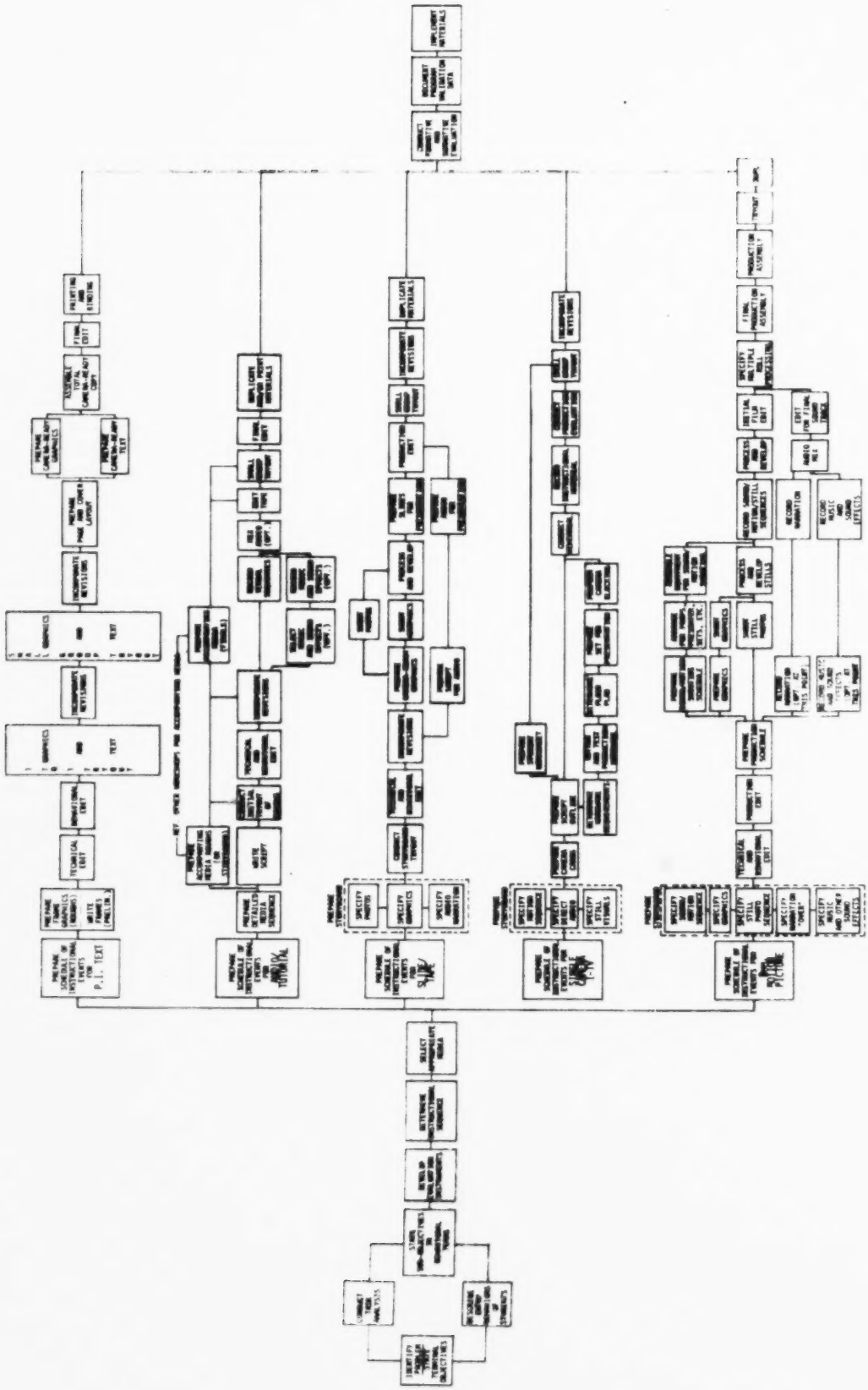

Figure 3.

- SLIDE/TAPE

- BASIC I-TV

- 8MM. MOTION PICTURE

The functional role of this objective is integrated into the scope of the mission objectives of the Product Development Section in the Center for Educational Technology:

1. Develop analytical models for the design of educational systems.
2. Plan and develop training programs covering all aspects of educational systems design.
3. Develop workshops in educational media design and production.
4. Develop research-based media presentation techniques.
5. Design and produce instructional materials for workshops.
6. Produce instructional modules in a variety of media.

DEVELOPMENTAL ASPECTS OF THE WORKSHOPS

A management-by-objectives approach was used in the development of the workshops, as shown in Figure 4. In this approach, the design and application of the workshops are derived directly from the mission of the Center for Educational Technology and the objectives of the AID/211(d) Grant. Corresponding objectives were drawn up for the Product Development Section, from which the specifications and milestones for developing particular workshops were generated.

A schedule of milestone completions follows:

DATE	WORKSHOPS	ACTIVITY
September 1971	All	Initial objectives for Product Development Section specified.
		Weekly seminars with Latin American program participants determine basic media design and production training requirements.
		Terminal objectives for multimedia workshops specified.

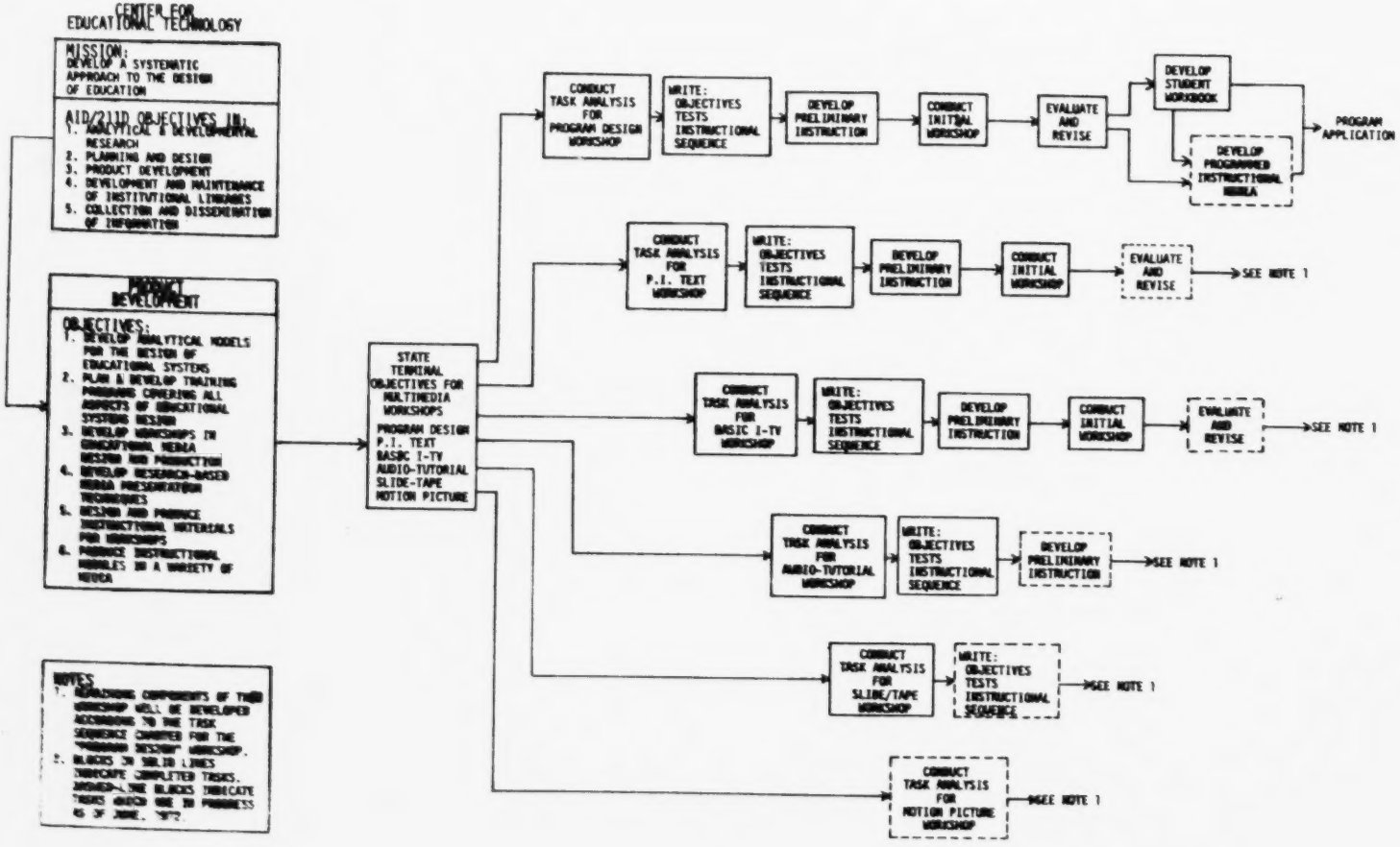
CENTER FOR
EDUCATIONAL TECHNOLOGY
MISSION:
DEVELOP A SYSTEMATIC APPROACH TO THE DESIGN OF EDUCATION
AID/211D OBJECTIVES (B):
1. ANALYTICAL & DEVELOPMENTAL RESEARCH
2. PLANNING AND DESIGN
3. PRODUCT DEVELOPMENT
4. DEVELOPMENT AND MAINTENANCE OF INSTITUTIONAL LIBRARIES
5. COLLECTION AND DISSEMINATION OF INFORMATION
PRODUCT DEVELOPMENT
OBJECTIVES:
1. DEVELOP ANALYTICAL MODELS FOR THE DESIGN OF EDUCATIONAL SYSTEMS
2. PLAN & DEVELOP TRAINING PROGRAMS COVERING ALL ASPECTS OF EDUCATIONAL SYSTEMS DESIGN
3. DEVELOP WORKSHOPS IN EDUCATIONAL MEDIA DESIGN AND PRODUCTION
4. DEVELOP RESEARCH-BASED MEDIA PRESENTATION TECHNIQUES
5. DESIGN AND PRODUCE INSTRUCTIONAL MATERIALS FOR WORKSHOPS
6. PRODUCE INSTRUCTIONAL MODULES IN A VARIETY OF MEDIA
NOTES
1. REMAINING COMPONENTS OF THIS WORKSHOP WILL BE DEVELOPED ACCORDING TO THE TASK SEQUENCE CHARTED FOR THE "PROGRAM DESIGN" WORKSHOP.
2. BLOCKS IN SOLID LINES INDICATE COMPLETED TASKS. DASHED-LINE BLOCKS INDICATE TASKS WHICH ARE IN PROGRESS AS OF JUNE, 1972
STATE TERMINAL OBJECTIVES FOR MULTIMEDIA WORKSHOPS
PROGRAM DESIGN
P.I. TEXT
BASIC I-TV
AUDIO-TUTORIAL
SLIDE-TAPE
MOTION PICTURE
CONDUCT TASK ANALYSIS FOR PROGRAM DESIGN WORKSHOP
WRITE: OBJECTIVES TESTS INSTRUCTIONAL SEQUENCE
DEVELOP PRELIMINARY INSTRUCTION
CONDUCT INITIAL WORKSHOP
EVALUATE AND REVISE
DEVELOP STUDENT WORKBOOK
DEVELOP PROGRAMMED INSTRUCTIONAL MODULE
PROGRAM APPLICATION
CONDUCT TASK ANALYSIS FOR P.I. TEXT WORKSHOP
WRITE: OBJECTIVES TESTS INSTRUCTIONAL SEQUENCE
DEVELOP PRELIMINARY INSTRUCTION
CONDUCT INITIAL WORKSHOP
EVALUATE AND REVISE
SEE NOTE 1
CONDUCT TASK ANALYSIS FOR BASIC I-TV WORKSHOP
WRITE: OBJECTIVES TESTS INSTRUCTIONAL SEQUENCE
DEVELOP PRELIMINARY INSTRUCTION
CONDUCT INITIAL WORKSHOP
EVALUATE AND REVISE
SEE NOTE 1
CONDUCT TASK ANALYSIS FOR AUDIO-TUTORIAL WORKSHOP
WRITE: OBJECTIVES TESTS INSTRUCTIONAL SEQUENCE
DEVELOP PRELIMINARY INSTRUCTION
SEE NOTE 1
CONDUCT TASK ANALYSIS FOR SLIDE/TAPE WORKSHOP
WRITE: OBJECTIVES TESTS INSTRUCTIONAL SEQUENCE
SEE NOTE 1
CONDUCT TASK ANALYSIS FOR MOTION PICTURE WORKSHOP
SEE NOTE 1

Figure 4.

DATE	WORKSHOPS	ACTIVITY
September 1971	Program Design	Selected Latin American students begin training in fundamentals of program design.
October 1971	Program Design	Task analysis for Program Design Workshop completed.
		Objectives, tests, and instructional sequence for Program Design Workshop begun.
December 1971	Program Design	Objectives, tests, and instructional sequence for Program Design Workshop completed.
		Latin American students complete program design project.
	P. I. Text	Task analysis for workshop in developing P. I. texts completed.
January 1972	Program Design	Preliminary instructional materials for Program Design Workshop completed.
February 1972	Program Design	Initial workshop in program design for students from Thailand begins.
	P. I. Text	Objectives, tests, and instructional sequence for P. I. Text Workshop completed.
	Basic I-TV	Task analysis for workshop in I-TV completed.
		Preliminary instructional materials for workshop in I-TV developed.

DATE	WORKSHOPS	ACTIVITY
March 1972	P. I. Text	Preliminary instructional materials for P. I. Text Workshop developed.
	Basic I-TV	Initial workshop in I-TV conducted for 30 instructors from Florida Junior College System.
May 1972	Program Design	Program Design Workshop evaluated and revised.
	P. I. Text	Initial workshop for P. I. texts for the Thai students begins.
June 1972	Audio-Tutorial	Task analysis for Audio-Tutorial Workshop completed.
	Program Design	Student workbooks for Program Design Workshop completed.
	P. I. Text	Initial workshop in P. I. texts for Thai students completed.
	Audio-Tutorial	Objectives, tests, and instructional sequence for Audio-Tutorial Workshop completed.
	Slide/Tape	Task analysis for Slide/Tape Workshop completed.

NOTE: Stage of development for all workshops as of June 1972, is shown in Figure 4.

APPLICATION TO INSTRUCTIONAL PROBLEMS IN DEVELOPING NATIONS

Crucial to the design of the workshops has been their application to real educational requirements in developing nations. They were initially conducted for selected Latin American students assigned to

CET to learn the techniques of instructional program design using the systems approach. Subsequently, the workshops in program design and in writing P. I. texts formed the central activities for students from Thailand who came to the Center under an AID/Thailand contract. Currently the workshops are scheduled for use in Korea as part of an AID contract for redesign of the Korean educational system. Under the project direction of Dr. Robert Morgan (who is also the head of FSU's Department of Educational Research) the following workshops are being applied: program design, P. I. text, slide/tape, and I-TV production.

CONTRIBUTIONS OF EXPERTISE PRESENTLY AVAILABLE AT FSU

The workshops, in their development, were constructed upon a foundation of advanced educational technology already in existence at FSU. The contributions of Dr. Robert Gagné and his analysis of the hierarchical nature of learning and instructional communication, and the work of Dr. Walter Dick in the systematic development of programmed instructional materials have formed the conceptual framework upon which the applied skills of the media development workshops have been built. Both professors Gagné and Dick have been available for consultation on details of the workshops as they have developed, and their suggestions have been incorporated into the design.

Dr. Leslie Briggs, whose work is in the forefront of research-based instructional design has contributed advance copies of his newer materials and examples of his graduate student projects to serve as models for portions of the workshops.

Dr. Robert Branson, as administrative director of CET, has been instrumental in arranging for the total design concept to be carried through by the CET staff. Additionally, he has selected experts in the instructional design field, such as Dr. William Deterline and Dr. Virginia Zachert, to serve as consultants on various design aspects of program design and media production.

INTEGRATION OF MEDIA PRODUCTION SKILLS WITH THE TOTAL PROGRAM DESIGN

The skills developed in the production workshops are fully integrated with those of the program design so that the students learn to master every aspect of instructional materials development. This means that the instructional intent must pervade every part of the production sequence in order to carry out that intent with some precision. In recent years there has been considerable progress in this area, due in part to the availability of scrupulous design models.

Nevertheless, practical applications of these models, such as the Dick model, shown in Figure 5, reveal a common problem. Although the procedures and skills implicit in the blocks of the system diagram are currently being well-taught and well-performed, in terms of specific instructional intentions, there is one area which deserves greater attention, on the basis of the number and complexity of its essential skill requirements. This is the area of instructional materials development, i.e., the specific production techniques for creating modules of instruction which can be tested against the requirements of the objectives. With the singular exception of the development of programmed instructional texts, the continuity of program design is usually interrupted at the point of production.

In the more complex media (I-TV and motion picture) most of the production techniques have a commercial origin, which may or may not be educationally sound. As a result the instructional program is quite often taken to the point of production and its development is given to a set of production techniques which evolved from the fields of entertainment, aesthetics, journalism, and advertising -- but not from educational technology.

The workshops, therefore, are designed to ensure the correspondence of the production technique to the instructional intent. The production component is developed as a set of disciplined skills integrated within the general systems model (see Figure 6). These skills then become a logical extension of the program designer's repertoire.

CUMULATIVE SKILLS DEVELOPMENT IN MULTIMEDIA WORKSHOPS

The workshop series is built upon the cumulative nature of skills in media production. The strategy chosen to accomodate the productive nature of the terminal objective is a progression from simple to complex skill development. The sequence ranges from the basic abilities in writing and graphics for programmed texts to more complex scripting, still-and-motion photography, and graphic requirements for I-TV and motion pictures.

For instance, the ability to write performance objectives is a crucial skill for all instructional materials development. The programming skills used in writing P. I. texts can be transferred as one of the components for scripting slide/tape, single concept film, and instructional television. The ability to mix audio from several sources, learned in the Audio-Tutorial Workshop, is also a requirement for the production of various other media. For this reason trainees begin with the workshop design. This workshop enables the learner to acquire the skills of identifying the problem, stating terminal objectives, conducting task analyses, developing evaluation instruments, and

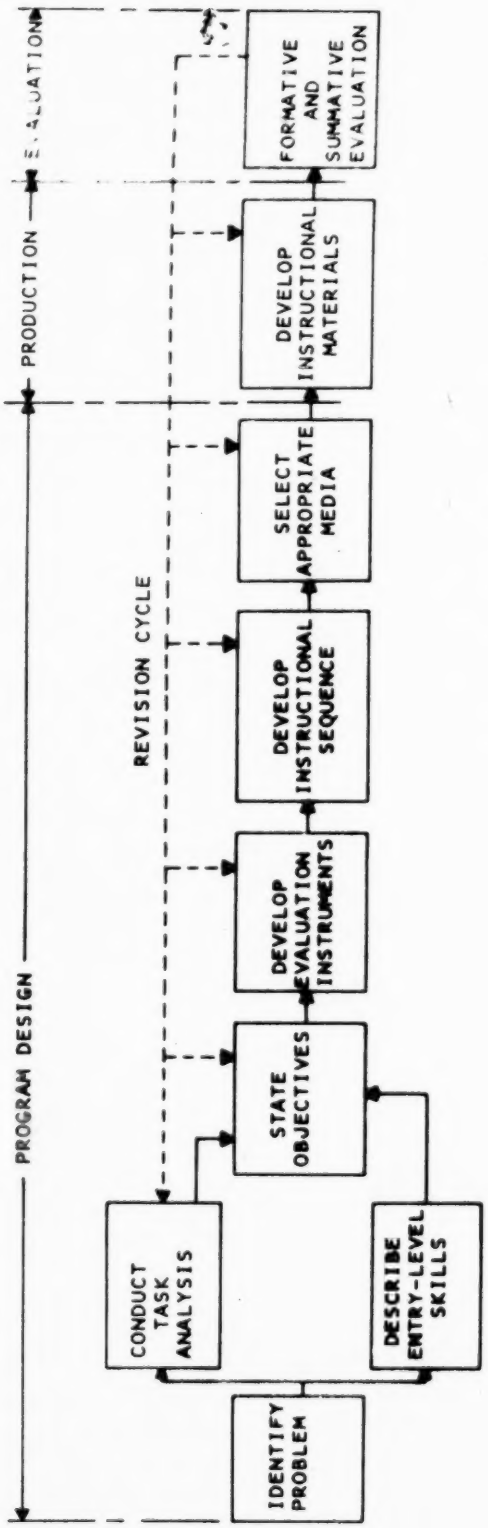

Figure 5.

Dick's Systems Approach Model for the Development of Instructional Materials.

(From D. Hansen, W. Dick, and H. Lippert, eds., Annual Progress Report. CAI Center, 1969.)

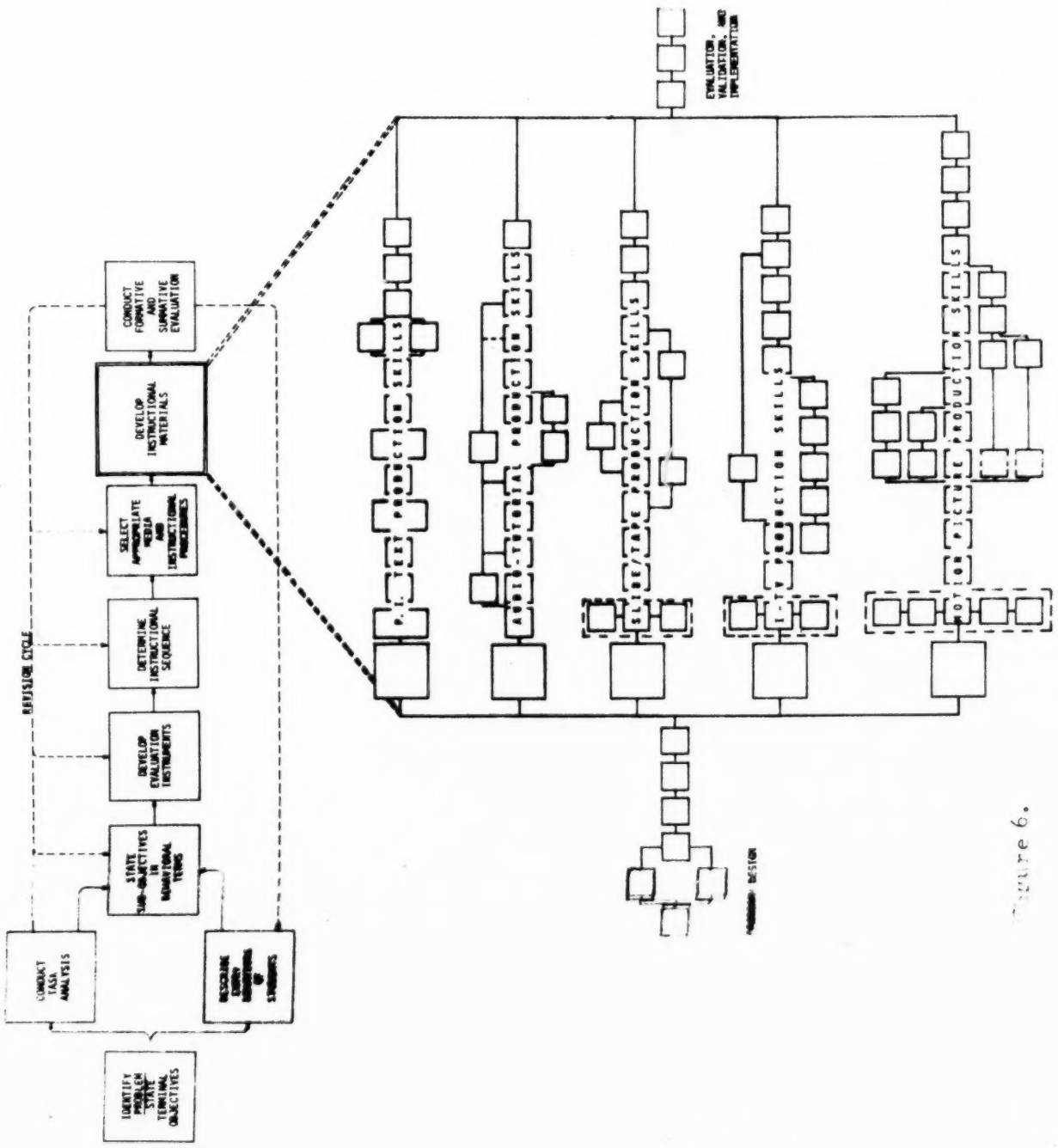
IDENTIFY PROBLEM STATE TERMINAL OBJECTIVES
CONDUCT TASK ANALYSIS
STATE SUB-OBJECTIVES IN BEHAVIORAL TERMS
DEVELOP EVALUATION INSTRUMENTS
DETERMINE INSTRUCTIONAL SEQUENCE
SELECT APPROPRIATE MEDIA AND INSTRUCTIONAL PROCEDURES
DEVELOP INSTRUCTIONAL MATERIALS
CONDUCT FORMATIVE AND SUMMATIVE EVALUATION
REVISION CYCLE
P.I. TEXT PRODUCTION SKILLS
AUDIO-TUTORIAL PRODUCTION SKILLS
SLIDE/TAPE PRODUCTION SKILLS
I-T-V PRODUCTION SKILLS
MOTION PICTURE PRODUCTION SKILLS
EVALUATION, VALIDATION, AND IMPLEMENTATION
DESIGN

Figure 6.

determining the instructional sequence.

The workshop in the production of programmed instructional texts is placed second because many of the principles underlying its construction are applicable to not only other media development but to all of instructional technology as well. A firm grounding in the principles and procedures of programmed text construction will give a strong foundation for work in other media.

The order of the other workshops is based on levels of complexity of production techniques which are required for instructional communication. Viewing instructional media as a variety of sensory inputs with which the student interacts would result in a set of instructional stimuli ranging from the written word and programmed text to complex visual and audio effects of motion picture and instructional television presentation. These effects have their corresponding production techniques and can be based upon standard presentational media already in widespread use.

The emphasis on programmed aspects of each medium is maintained to build upon initially learned capabilities in the initial disciplines of P. I. texts and to rigorously apply systematically derived behavioral techniques across the entire spectrum of mediated instruction.

PROJECT SUMMARIES

PROJECT I: SYSTEMS TRAINING FOR INPE PERSONNEL. In the summer of 1971, the Brazilian Government contracted CET to provide an educational systems training program for its Instituto de Pesquisas Espaciais (INPE), which is that country's space agency. Brazil sought this assistance from CET in support of its geo-stationary communications satellite program and other Brazilian efforts to improve their educational programs on a nationwide basis. Six educational specialists from INPE were sent to the Center for two months to participate in a specialized and intensive workshop in the systematic design of educational programs, and another workshop in the development and evaluation of programmed instructional materials. While at the Center, the participants applied the systems approach in developing a pre-deployment plan for a satellite to be used for educational purposes. Since returning to Brazil, the six member team has designed its own workshop for training others in the development of programmed instruction, which is the multiplier effect that CET strives to achieve as an additional benefit from all of its technical assistance efforts to developing countries.

PROJECT II: DEVELOPMENT OF EDUCATIONAL TECHNOLOGY IN LATIN AMERICA. Under contract to AID, CET assisted Brazil, Colombia, Guatemala, and Panama in improving their educational systems. Specific objectives of the contract were: (1) to promote small scale experimentation designed to examine ways to lower unit costs for educational achievement; (2) to prepare guidelines for educational planning; and (3) to provide technical advisory assistance in the application of information management systems to education. The research studies were conducted by Latin Americans as an integral part of the AID sector loan program. FSU's assistance consisted of training Latin American educators in educational research and technology at its campus, conducting educational technology workshops on site in selected Latin American countries, providing technical assistance to the countries, and providing educational facilities planning materials for use throughout Latin America.

PROJECT III: EDUCATIONAL CHANGE THROUGH SYSTEMS PLANNING FOR THE REPUBLIC OF KOREA. The University, under contract to AID, is assisting the Republic of Korea to systematically redesign its primary and middle school systems to make their educational programs maximally supportive of national goals in the social and economic sectors. An initial survey of Korea's social and economic needs and educational resources was conducted by a joint FSU-ROK team in 1970. Subsequently, in 1971, the Korean Government formed the Korean Educational Development Laboratory (KEDL) to implement

the findings of that survey. With continuing technical advisory assistance from FSU, KEDL is currently conducting systems planning activities for major educational reform. Future plans call for establishing a model school for try-out of a prototype educational system being designed by KEDL. Being considered in the instructional approach for this system are such techniques as programmed instruction, individualized instruction, and instructional television. Some of the objectives for the prototype system are more rapid advancement for students through the system, an increase in the number of students which the system can accomodate, and lower costs per student.

PROJECT IV: TECHNICAL ASSISTANCE TO LATIN AMERICAN COUNTRIES IN THE DESIGN OF INSTRUCTIONAL SYSTEMS (OAS I). The Organization of American States (OAS) sent eleven Latin American educators to FSU in mid-1971 for one year of training in the design of instructional systems. The training program consisted of selected course work in the College of Education and relevant practical experiences provided through the students' participation in on-going projects of the Center and the College. Two students have been extended to complete graduate degrees. Four have already completed Masters degrees. Six students were selected to go to Argentina as trainee consultants on a workshop and evaluation project being prepared there. When these students return to their jobs some of them will enter at a higher level. They will be available to be called upon individually or together as a team to act as international consultants for the OAS. Their cumulative specialty areas include evaluation, educational research, communications, teacher training, systems planning, media engineering, media administration, and educational planning.

PROJECT V: DEVELOPMENT OF EDUCATIONAL MEDIA SPECIALISTS FOR LATIN AMERICAN COUNTRIES (OAS II). The Center has contracted with the Organization of American States to provide a one year training program in educational technology and media development for twelve Latin American participants, which started in March 1972. Most of the participants will take one or two courses per quarter in the specialty area chosen to pursue throughout the program. Specialty areas will include educational research, educational systems, evaluation, educational administration and management, and adult education. In addition, all students will participate in a CET designed workshop in the systematic development, implementation, and evaluation of multimedia instructional materials in the English, Spanish, and Portuguese languages. Upon completion of their training at FSU, the participants will return to their respective countries and apply various aspects of educational technology to their jobs and train others. Materials developed by the participants as part of their workshop training at CET will be used by OAS for a workshop in Buenos Aires.

PROJECT VI: DEVELOPMENT OF PROGRAMMED INSTRUCTION FOR VOCATIONAL EDUCATION IN THAILAND. The Royal Government of Thailand with assistance from AID has undertaken a major project to upgrade and expand its vocational education programs in order to provide trade and industrial training opportunities to larger segments of its urban poor and rural populations. CET, through a contract from AID, assisted Thailand in its efforts by training a group of six vocational educators in the systematic development, implementation, and evaluation of programmed instructional textbooks and manuals. To accomplish this, the six member team participated in a workshop designed by CET. During this training program the Thai participants developed five programmed instruction textbooks on vocational subjects such as auto mechanics, electricity, electronics, agriculture, and animal husbandry. A plan for implementing and evaluating the programs in Thailand was established in which CET will provide follow-up activities. After returning to Thailand, the Thais will work together as a group in the Department of Vocational Education in the Ministry of Education to: (1) validate and publish the programs, (2) develop additional programs, and (3) train other Thais in programmed instructional materials development and evaluation to increase the number of skilled programmers in Thailand.

FSU COURSE OFFERINGS: EDUCATIONAL RESEARCH AND EDUCATIONAL ADMINISTRATION

Department of

EDUCATIONAL ADMINISTRATION

Professors: L. V. Rassmussen, Banghart, Black, Blake, Frick, Garvue, Stone, Swearingen; *Associate Professors:* Kraft, Luebkemann; *Assistant Professors:* Bass, Poulson, Purrington, Vertuno; *Instructor:* Bonar.

The Department of Educational Administration offers courses leading to the master's, advanced master's, and doctoral degrees. Graduate programs are developed for students who wish concentrated work in all areas of educational administration including general administration, finance and economics, school plant planning and management, supervision and curriculum, personnel administration, and systems analysis.

In addition to University requirements, factors determining admission include undergraduate preparation, scholastic aptitude, personal goals and interests, personality, and experience.

Course for Advanced Undergraduate and Graduate Students (Prefix: EDA)

490. Organization and Control of Education (3).

Courses for Graduate Students (Prefix: EDA)

501. Educational Administration (4).
502. The Principalship (3).
503. Legal Aspects of Education (4).
504. Personnel Administration in Education (3).
505. Planning Educational Facilities (3).
506. School Plant Management (3).
507. School Finance (4).
508. Fiscal Management in Education (4).
521. Supervision of Instruction: Concepts and Issues (4).
522. Supervision: Tasks and Processes (5).
530. Basic Concepts in Curriculum Planning and Organization (5).
531. Organizing Programs of Curriculum Improvement (3).
541. Elementary School Organization and Evaluation (4).
551. The American High School (3).
552. The Program (Curriculum) of the High School (3).
553. Modern Trends and Innovations in High School Education (4).
554. School for Young Adolescents (3).
561. Instructional Problems and School Organization (3).
570. Educational Systems Analysis (4).
591A •,B •,C •,D •. Directed Individual Study (1-4 hours each). (Approved for S or U grade only.)
597r •. Supervised Research (3-6). (Approved for S or U grade only.)
598r •. Supervised Teaching (1-6). (Approved for S or U grade only.)
599. Thesis (5-9). (Approved for S or U grade only.)
599A. Advanced Master's Thesis (5-9). (Approved for S or U grade only.)
602 •. Quantitative Methods in Educational Administration (3).
603 •. Allocation of Educational Resources (3).
604. Curriculum-Decision Making (3).
608. Administrative Theory (3).
623 •. Supervisory Theory (3).
633 •. Curricular Theory (4).
634 •. Teaching as a Process (3).
641. Principles of Educational Planning (6).
642. Processes of Educational Environmental Planning (6).
643. Design of Educational Facilities (6).
651. Introduction to the Economics of Education (4).
652. Planning Human Resource Development (4).
653. Economic Research in Education (4).
654. Manpower Planning and Manpower Utilization (4-8).
655. Controversial Educational Issues in Development Planning (4-8).
671 •. Seminar: Organizational Behavior (3).
673 •. Administrative Research (3).
675. Departmental Seminar and Research Projects (0). (Approved for S or U grade only.)
676A •,B •,C •. Internship in Educational Administration (5 hours each). (Approved for S or U grade only.)
699. Dissertation (18-). (Approved for S or U grade only.)
800. Master's Comprehensive Examination (0).
805. Advanced Master's Comprehensive Examination (0).
810. Preliminary Doctoral Examination (0).
820. Dissertation Defense (0).

Department of

EDUCATIONAL RESEARCH AND TESTING

Professors: Robert M. Morgan, Brannon, Briggs, Curtis, Fletcher, Gagne, Hills, [illegible], Kropp, Stoker; *Associate Professors:* Beard, Brewer, Dick, Foster, Hansen, Stakenas; *Assistant Professors:* Arreola, Brown, Hackett, Merrill, Miller, Schluck, Tennyson.

The Department of Educational Research and Testing offers graduate instruction in three program concentrations (1) educational evaluation and measurement, (2) instructional systems development, and (3) educational psychology. Educational psychology is an interdepartmental program offered in cooperation with the Department of Psychology. These programs encompass basic and applied research methodology, statistics and experimental design, educational test development, human learning and the facilitation of classroom learning, the development and use of technology in education, computer applications, a behavioral approach to instructional design, and analyses of the major variables in the educational environment which affect student learning.

Student programs are planned in terms of the individual's professional goals and of the competencies he has previously acquired. All graduates should be prepared for college and university teaching in educational research, measurements, statistics, experimental design, educational psychology, and instructional systems. Students will also be equipped to manage or participate in educational research and development activities in institutional settings, public schools, government or military agencies, and in private industry.

A student's program in most instances will include study in other departments in the University.

The Department offers the Master of Science, the Doctor of Education, and the Doctor of Philosophy degrees.

Courses for Advanced Undergraduate Students (Prefix: EDR)

401. Measurement and Evaluation in the Classroom (4). Principles and procedures involved in standardized and teacher-constructed tests and problems of grading.

Courses for Graduate Students (Prefix: EDR)

501. The Use of Tests in Teaching and Guidance (5). Prerequisite: Educational Research and Testing 510. Basic theory of measurement. Use and selection of standardized tests of intelligence, aptitude, interest, and personality.

502. Theory of Evaluation (4). Prerequisites: Educational Research and Testing 510 and 501; 511 recommended. Introduction to test theory. Mathematical bases for operational procedures; practical applications of theory as it pertains to norm-referenced and criterion-referenced tests.

503. Tests and Measurements: Advanced (5). Prerequisites: Educational Research and Testing 502, 510, 511; 511 may be taken concurrently. Advanced course in the theory, principles, and techniques of measurement.

504. Theory of Scaling and Applications to Education (3). Prerequisites: Educational Research and Testing 503 and 511. Theoretical development of scaling techniques; applications of techniques.

510. Statistical Applications in Education: Descriptive and Basic Inference (5). Application of descriptive and inferential techniques to educational data: hypothesis testing, confidence intervals, and correlational techniques.

511. Advanced Statistical Applications in Education: Analysis of Variance and Covariance, Regression (5). Prerequisite: Educational Research and Testing 510 or equivalent. ANOV - design of experiments. Application of factorial, nested-factorial, repeated measures, and other designs.

512. Special Topics in Design and Anal sis of Experiments in Education (5). Prerequisite: Educational Research and Testing 511 or equivalent. Linear, curvilinear regression—single and multiple variable cases.

513. Applications of Non-Parametric Statistics (3). Prerequisite: Educational Research and Testing 511 or equivalent. Consideration and application of topics in non-parametric statistics.

514. Applications of Factor Analysis (2). Prerequisite: Educational Research and Testing 511. Knowledge of computer programming desirable. Survey of factor analytic applications in student's area of interest.

515. Application of Multivariate Analysis to Educational Problems (3). Prerequisite: Educational Research and Testing 511. Design and analysis of educational and psychological research studies which involve multiple independent and dependent variables.

520. Methods of Educational Research (4). A survey of selected types of educational research and appropriate related techniques; emphasis on criteria of validity.

522. Experimental and Quasi-experimental Design in Instructional Psychology (4). Prerequisites: Educational Research and Testing 511 and 520 or equivalent preparation.

525. Advanced Topics in Educational Research (4). Prerequisite: Educational Research and Testing 520 or consent of the instructor. A systematic treatment of selected topics.

526 •. Seminar in Educational Field Research (4). Evaluative and systematic studies of operating school systems incorporating curricular, institutional, student, and physical plant variables.

532. Computer Analysis of Educational Data (3). Prerequisite: Educational Research and Testing 510. Multivariate procedures and instrumentation which depend on computer technology.

536. Computers in Education (4). Prerequisite: Educational Research and Testing 510.

537. Techniques in Programmed Instruction (5). Systematic design, development, and validation of instructional materials. Material development project is required.

538. Computer Assisted Instruction: Languages (3). Prerequisite: Educational Research and Testing 537 or permission of instructor. The learning of computer languages necessary for implementation of learning materials on a CAI system.

539. Computer Assisted Instruction: Advanced Topics and Implementation (3). Prerequisites: Educational Research and Testing 537 or equivalent and 538. An in depth coverage of topics in CAI and the implementation of instructional material.

540. Psychology for Students in Education (3). A knowledge of selected principles, theories, and research findings of psychology and their application to educational planning and research.

541. Basic Concepts of Social Psychology Relevant to Education (3). An understanding of social and psychological theory, focusing on three-variable models along with a critical analysis to determine validity and relevance.

542. Application of Social Psychology to Education (3). Prerequisite: Educational Research and Testing 541. Applications of theory and concepts from social psychology to problems of innovation and change; procedures for evaluating the effects.

543. Operational Objectives in Educational Research (3). Models of learning, instruction, and measurement provide the bases for analysis of the relationship of objectives, variables, and hypotheses. Operational objectives communicate and measure both the intent and the outcome of instruction.

544 •. Origins of Individual Differences Important in Education (3). Application of differential psychology to classroom manipulations.

550. Conditioning and Classroom Behavior (5). Prerequisite: Educational Research and Testing 540 or consent of instructor. Dominant learning theoretic developments in educational experimentation, focusing upon a survey of research studies.

552 •. Facilitation of Classroom Learning (3). Prerequisite: six hours of educational psychology or consent of instructor. Ways in which learning principles are, or may be, applied in the classroom.

553 •. Seminar in Human Abilities and Learning (4). Prerequisites: course work in human learning and measurement. Integration of principles of learning and individual differences in the study of complex behavior.

560r. History and Theory of Educational Technology (3). Major elements of educational technology including definition, learning theory, and taxonomy; instructional design models and strategies; media characteristics and research.

565. Human Factors in Training and Instructional Systems (3). An instructional system model which includes task analysis, analysis of entering behaviors, design of instruction, and formative evaluation; the framework for studying interrelationships.

567. Computer Simulation and Information Processes of Learning and Instruction (3). Role and nature of information processing models of associative structures and complex symbolic behaviors within an instructional context.

577. Theories of Learning Relevant to Education (3). Designing and specifying the characteristics of one or more systems of instruction; making rationally organized descriptions of the theories, constructs, and subordinate hypotheses of major theorists (Skinner, Gagne, Ausubel, and Bruner).

591A,B,C,D. Directed Individual Study (1-4 hours each). (Approved for S or U grade only.)

595. Departmental Seminar (0). (Approved for S or U grade only.)

597r. Supervised Research (1-9). (Approved for S or U grade only.)

598r. Supervised Teaching (3-6). (Approved for S or U grade only.)

599. Thesis (5-9). (Approved for S or U grade only.)

601. Measurement Seminar: Current Topics (3). Prerequisite: Educational Research and Testing 503.

602. Measurement Seminar: Classical Topics (3). Prerequisite: Educational Research and Testing 503.

603. Measurement Seminar: Decision Processes (3). Prerequisite: Educational Research and Testing 503.

604r. Seminar in Advanced Measurement Problems (3). (For advanced doctoral students only.)

605r. Seminar in Advanced Instructional Systems Problems (3). (For advanced doctoral students only.)

606r. Seminar in Advanced Educational Psychology Problems (3). (For advanced doctoral students only.)

630. Workshop: The Design of Instruction (5). Designed to strengthen instruction in the area of educational systems and instructional technology; to provide a conceptual basis for subsequent instruction in particular educational media.

631. Seminar: Models for Design of Instructional Systems (3). Application of specific conceptual and procedural model for design of multimedia materials. Identification or development of alternate models located at various levels of complexity, and based on alternate conceptions of the learning process.

651 •. Seminar: Learning of School Subjects (4).

652 •. Seminar: Research on School Subject Learning (4).

660r •. Seminar: Research Problems in Educational Psychology (3). Prerequisites: twenty hours credit in educational research and testing and consent of the instructor.

699. Dissertation (18-). (Approved for S or U grade only.)

800. Master's Comprehensive Examination (0).

810. Preliminary Doctoral Examination (0).

820. Dissertation Defense (0).

NEW COURSES UNDER DEVELOPMENT

"Education's Role in the Development of Population Awareness"

This course will deal in general as well as specific terms with the part education may play in the development of national population programs. Various models and approaches will be examined and evaluated.

"Education and Minority Groups Abroad"

A pervasive worldwide problem is how national educational systems relate to minorities and their needs. This course will consider, on a comparative case study basis, how other educational systems deal with indigenous minorities and an attempt will be made to evaluate the results.

"Seminar in Project Management"

The mission of this course is to provide senior graduate students in education with skills for managing educational R & D projects. Topics covered in the course will include: marketing strategies, project planning, contracting, budgeting, reporting, monitoring and project personnel management.

COMPUTER ASSISTED INSTRUCTION CENTER

The Computer Assisted Instruction (CAI) Center is part of the FSU Division of Instructional Research and Service. It supports three computers whose services are dedicated to research on all aspects of computer technology as applied to education. Specific areas in which research has been or is being conducted are computer assisted instruction, computer managed instruction, simulations, games, psychological testing, and problem solving. The CAI Center also provides instructional services for the University. Courses employing student use of the computers have been developed by various departments in areas such as education, psychology, physics, and library science.

Available equipment includes an IBM 1500 Instructional System consisting of an 1800 central processor, a 1502 station controller, sixteen 1510 CRT displays each with a keyboard and a light pen, one 1518 typewriter, and five 2310 disk drives with removable disk packs of 1.024 million bytes, plus tape units, card reader/punch, and a 1443 line printer. In addition, the CAI Center has interfaced a Digital Equipment Corporation PDP-8 Communications System to the IBM 1500 in order to support sixteen remote and local teletypes. They have installed a PDP-8 TSS/8 time-sharing system which supports sixteen teletypes. A data management system has been developed which compresses, sorts, merges, and summarizes data for analysis purposes.

D. To develop an information center on educational technology through the acquisition and dissemination of books and relevant documents to serve as a library of significant research collected from throughout the world.

It is widely known that the dissemination of existing and new information is one of the more formidable tasks faced during the second half of the twentieth century. Internationally renowned scholars have regularly attested to the vast "knowledge explosion" which is upon us. Knowledge, to be of value to practitioners in the field, must be recent and relevant. To provide an information center which not only gathers recent and relevant information, but also effectively disseminates it, is a highly difficult assignment. Much of the type of information needed by educational planners in developing nations is in the form of recent government reports, analyses made by international banking organizations, plans stated by private organizations, and plans for development promulgated by funding agencies.

It is planned that the resource center at Florida State University, working with the newly cooperating institutions with whom linkages have been formed, will serve as a vehicle for the collection and dissemination of information on a timely basis.

TECHNICAL INFORMATION AND MATERIALS SECTION

CET operationalized its Technical Information and Materials Section in September 1971. It is staffed by a full-time professional librarian. The facility is located among the office suites and instructional areas of the Center and is equipped with open stacks, conserva files, reading tables, card catalog, and a microfiche reader-printer.

During the first year of operation emphasis has been placed on collection of materials and the establishment of a system for continuous collection to ensure the receipt of current materials. This process includes: surveying the needs of the staff and students; announcing our existence to research institutions, publishers, and individuals involved in the educational technology field; maintaining contact with FSU and Florida State libraries; gaining entry to pertinent mailing lists; and cataloging copies of all documents and instructional materials produced by the Center.

The acquisition of materials is aimed toward those which are related to educational technology, especially those appropriate for developing countries. To date these materials represent all levels of education.

Specific emphasis is placed on acquiring materials in the areas of systems analysis, programmed and individualized instruction, education in foreign countries, and educational research. The inventory to date includes: standard reference books such as encyclopedias, American and foreign dictionaries; a wide variety of journals; research and government reports; files on research of educational reform programs in Latin America, Africa, and Asia; approximately 200 ERIC fiche for the microfiche reader-printer covering educational technology from 1968 to the present; approximately 200 assorted volumes dealing with programmed instruction, teacher education, educational television and radio, educational and vocational technology, and educational evaluation; and all CET reports, papers, and supplementary instructional materials.

The greatest dissemination function of this facility has been to serve as a resource base for CET research and instructional activities. Circulation of new materials among the staff serves as a medium for informing them of new publications and activities in the areas of educational technology. As the Center becomes involved with more developing countries and completes more projects, much more information will be available for dissemination and exchange.

The Center also provides for the translation of technical articles into Spanish or Portuguese (and shortly French) in order to increase the number of potential users. It is anticipated that through this Technical Information and Materials Section, CET will be able to remain abreast of the most recent publications, and of any significant progress being made in the area of educational technology, and therefore serve as an effective information exchange center.

E. To establish strong and mutually reinforcing relationships with the growing number of national and international institutions, organizations, activities and projects involved in educational technology for the developing countries.

Under the terms of the 211(d) Grant, CET has been actively engaged in the establishment of meaningful and mutually supportive relationships with institutions overseas involved in the examination, evaluation and advancement of educational technology for the promotion of developmental processes and objectives. These international institutional ties have evolved at CET's initiative as well as at the initiative of foreign institutions, and while they vary in scope and intensity, we have classified them as interinstitutional linkages, liaisons, and contacts. If the mesh between the foreign institution and CET is close and compatible in terms of foci of interest and innovation, and of materials development and personnel, actual linkages are contemplated and encouraged. If it is felt that both parties would benefit from a sustained exchange of information, visitations when possible and convenient, and perhaps at some point, although not necessarily, a more active level of interaction between the two is possible, then a liaison relationship is formed. Where there is more than a casual interest, but not active interinstitutional involvement, exchanges of information are carried out largely through correspondence and are considered simply contact relationships. Naturally, the kind of relationship established with any given institution is subject to change depending on developmental trends and conditions. However, very careful consideration is given to the establishment of full linkage relationships because this implies a commitment on both sides to become involved in problems of mutual concern in educational technology on a sustained and active basis over a period of years. This commitment in terms of research, materials, and personnel will seek to produce innovative answers to problems and contribute to the "state of the art" in educational technology. Therefore, it is not something to be undertaken or terminated lightly. CET cannot be certain at this point, with the exception of perhaps KEDL in Korea, of either the number or level of mutual commitments to be developed under the Grant's interinstitutional linkage component. As nearly as we can predict at this point, those listed here as being in the interinstitutional linkage or liaison category have that level of potential, but there may well be instances where it will be necessary to qualify or modify that determination. We have not listed simple contacts as a separate reporting component.

LATIN AMERICA

Argentina: Liaison. Materials and expertise generated by the 211(d) Grant have been used at CET to train OAS (Organization of American States) representatives who in turn have trained Argentinians for the Ministry of Education in Buenos Aires. In effect, it is anticipated that the training program which has been conducted there will assist the Argentinians to organize and analyze technological resources, training, and procedures in the seven key provinces of their country as well as in the capital city.

There is interest in actively following this multiplier effect to gain some insights on the final results achieved and to determine the kinds of follow-up activities which would be desirable in terms of exchanges of materials and information. Dr. Clifton Chadwick, formerly associated with CET, and presently stationed in Buenos Aires with the OAS Regional Office, may be able to provide relevant information on these outcomes.

Brazil: Liaison. Under a separate agreement with CNAE (Commisao Nacional Atividades Espaciais later renamed INPE -- Instituto de Pesquisas Espaciais), CET provided an intensive three-month program of consultation and training services aimed at the formation of a nucleus of Brazilian specialists in innovative educational technologies, the study of educational problems in specific areas, and the study of and suggestions for the application of these innovative technologies to Brazilian educational problems. Six Brazilians pursued this intensive program at Florida State University and returned to their agency in Brazil. Subsequently, courses taken at FSU by the Brazilian trainees have in turn been taught by them to their colleagues. The former CET trainees, who during their training prepared a systems approach design for INPE as an applicable model, are now involved in I-TV planning and programming in the states of Rio Grande do Norte and Pernambuco. CET has remained in touch with them by supplying supporting books, materials, and advice. In addition, direct contacts have been maintained through the assignment of Dr. Richard M. Durstine of FSU to USAID/Rio de Janeiro (HRO), and by occasional visits of former CET associate Dr. Clifton Chadwick now in Buenos Aires, as mentioned above.

Because a determination is still being made by the Brazilian Government on the delineation of responsibility for educational television among its agencies, institutional linkages per se have not been established, in spite of a rather high level of exchange between CET and Brazil in terms of training personnel, consulting services, and

information. At some future time CET and an appropriate organization in Brazil may consider the establishment of interinstitutional linkages. Meanwhile, it is anticipated that there will be a continuing liaison with key individuals and institutions, especially those involved in ETV.

Four additional Brazilian educators have been studying at FSU during the 1971/72 academic year under the auspices of the AID/Latin American Regional Contract. Part of their program has involved the development of educational experimental design projects to be tried out on a small scale within their home agencies. As follow-up technical assistance is provided under the terms of the regional contract, personal contacts will be maintained between CET/FSU and the Brazilian agencies in which these educators work.

El Salvador: Liaison. During the meeting of the CET International Advisory Council in April, Walter Beneke, a member of that group, formerly the Minister of Education and then the Minister of Foreign Affairs of El Salvador, invited associates and members of the CET staff to visit El Salvador and review the results to date of the Salvadorean educational reform. In July the CET group, which included Walter Dick, Assistant Dean for Education, Howard Stoker, Acting Head of the Department of Educational Research, Robert Gagné, Professor of Educational Research, Robert Branson, Director of CET, and other members of the staff accompanied by OAS participants, spent five days in El Salvador studying their educational reform.

The program arranged for the CET group covered the background, evolution, and evaluation of the project with the Salvadoreans being interested in any recommendations for modifications or suggestions which might improve the project. Although officially hosted by Minister Beneke, the USAID mission in San Salvador, including Dr. Stanley Handleman, Dr. Ray San Giovanni and Mr. Henry Ingles, participated actively in providing information on the program and descriptions of evaluative procedures being used.

The impact of the I-TV project on the schools, teachers, curriculum, and pupils was the CET group's major focus of attention. The immediate experience of seeing such a program in operation and observing problem areas which develop in the implementation process as well as having some personal involvement with what is probably the most extensive use of I-TV at the national level in Latin America was of distinct value to the CET group.

It is anticipated that there will be a continuing exchange of information between associates in El Salvador and CET. While the extent and

types of other linkages which might develop between CET and El Salvador's educational reform program are presently vague, in part because of the recent change in government there, indications are that there will be additional training of Salvadorean personnel at CET/FSU. At present one Salvadorean is undergoing training at FSU.

Guatemala: Liaison. In response to an invitation from USAID/Guatemala and Government of Guatemala officials, CET sent two small groups to Guatemala City in May and September 1971 to participate in the conceptualization and evaluation of the Basic Village Education (BVE) project. As a plan of action was devised, it was determined that CET/FSU should not then become directly involved in the project implementation, but should, however, continue as an occasional evaluator and as a readily available source of advice or training for Guatemalan personnel. To support these objectives, there is a liaison relationship between the Basic Village Education project in the Ministry of Education and CET.

In conjunction with this, Guatemalan visitors from the Ministry of Education and Planning visited Tallahassee on August 5 and 6 to meet FSU personnel and observe the facilities and capabilities (e.g., Computer Assisted Instruction, Division of Instructional Research and Service Instructional Television Service, Adult Education Department, etc.), which might have relevancy to the BVE project. During the past year a Guatemalan educator, Carlos Morales, has been enrolled at FSU and will finish his M.A. at the end of Summer Quarter 1972, then return to Guatemala and work on the implementation of the BVE project. CET is prepared to backstop Morales in this effort.

Discussions are now being held with appropriate AID and Guatemalan officials related to the possible future training at CET/FSU of additional personnel who will be involved in the Basic Village Education project.

Panama: Liaison. Five representatives of FSU (Drs. Frank Banghart, Robert Branson, Richard Durstine, Sydney Grant, and José Hipólito Gonzalez), spent the week of October 18, 1971, in Panama working with selected members of the Panamanian Ministry of Education and other government officials. The FSU specialists in educational systems, systems analysis, and educational technology, all associated with CET, traveled under the auspices of the AID/Latin American Regional Contract. They were joined in Panama by AID/Washington representative, Stanley Applegate.

Meetings were held in Panama City with thirty key Panamanian officials representing various departments of the Panamanian Ministry of Education and other relevant national agencies. The purpose was to conduct a workshop in Problem Identification, Solution Generation, and Costing of Alternative Solutions in Education. Dr. Charles G. Briggs and Mr. Thomas Hazard of USAID/Panama assisted with liaison and support, and the official responsible for liaison with the Panamanian Ministry of Education was the Sub-Director General of Education, Dr. Nelis Borrero.

A research and development proposal developed by the Panamanian representative at FSU/CET under the AID/Latin American Regional Contract has tentatively been accepted by the Government of Panama, and it is anticipated that three more Panamanian educators will come to work at CET on programmed instructional materials for use in Panamanian commercial high schools.

Peru: Liaison. In conjunction with other activities in Peru by CET associate Dr. Sydney R. Grant, discussions have been held with two institutions there concerned with educational technology. USAID/Lima has been kept apprised, and has been supportive, of these contacts.

A Center for Educational Media for Development at Catholic University in Lima is in the process of being established with considerable financial assistance from the West German Konrad Adenauer Foundation both in terms of equipment and initial operating costs. The Rector of the university has expressed interest in establishing a relationship with CET which might provide technical expertise and training for Peruvians who will be working in the center. During 1972/73, Dr. Estela Garland, a professor from Catholic University and Director of its new center, will be working at CET as a Research Associate. When the center in Lima actually begins to function, it is anticipated that she will return to resume the direction of it.

The other Peruvian organization involved in educational technology with which CET has established contact is the National Institute for Research and the Upgrading of Teachers. This institute has the following components: a Research Center, a Center for the Upgrading of Teacher Training, and an Educational Documentation Center. Dr. San Martin, the Director of this Institute, plans to have ten Peruvians sent to CET and undergo intensive short-term training in Spanish in educational technology. It is anticipated that this group will arrive in Tallahassee during the autumn of 1972.

In both instances, these centers in Peru have broad support and a clear mandate to promote and develop the use of educational technology.

At Catholic University, there is an additional interest in having their center serve the needs of the region as well as the nation.

Colombia: Linkage. In July 1971, the University of Antioquia in Medellin and FSU exchanged letters completing an interinstitutional linkage between the two universities with emphasis on education. Under the auspices of this linkage, which has been in the formative stage for some three years, there has already been a considerable exchange of information, advice, consulting, and personnel training between the two institutions. In terms of graduate work at FSU, the following staff members from the University of Antioquia have been in residence and full-time study: Dr. Guillermo Velez-Velez, formerly Dean of the Faculty of Education at Antioquia, has completed his Ph.D. in education and returned to Medellin as Vice-President for Academic Affairs; Alirio Arboledo-Oritz, present Dean of the Faculty of Education at Antioquia, has completed all but the dissertation on his Ph.D. program at FSU; Isaias Aguirre, former head of the Modern Language Department at the University of Antioquia, completed his M.A. at FSU; and Bernardo Restrepo, former Social Science Professor at the University of Antioquia, is presently engaged in his doctoral research, in the Medellin region, on educational technology related to the University of Antioquia's Escuela Unitaria (one to three teacher multigrade rural schools) project.

From this basic relationship with the University of Antioquia, additional significant contacts have been established which, during 1971/72, have been largely in terms of personnel training. In conjunction with this, René Corradine, former Dean, Division of Education, University del Valle at Cali, Colombia, is at FSU working on his doctorate in education, and Gonzalo Arboleda-Palacio, formerly a professor of education at the University of Antioquia, and more recently the Assistant Director of ICETEX in Bogotá, is now enrolled in a doctoral program in educational administration. In addition to these, and under other auspices, Manuel Ortega, Media Specialist at the University of Antioquia, and Jaime Lozano, ETV Specialist in Bogotá, have completed special training programs conducted by CET. In September, Professor Lilyana Rodas of the Department of Counseling Education at the University of Antioquia will come to FSU to work on an M.A. degree in that field.

There has been and will continue to be an exchange of information and personnel. Furthermore, there is also interest being expressed by Colombian officials in CET considering with them the development of projects and programs in the areas of informal education for adults and in rural elementary education, perhaps following up on

the Escuela Unitaria research project in Medellin (see Restrepo's abstract in Annex). Moreover, Dr. José Hipólito Gonzalez, a Colombian engineer-educator, who has just completed his Ph. D. at FSU, may be able to work directly in setting up educational management information systems in Colombia.

NEAR EAST

Lebanon: Liaison. The Chairman of the Department of Education at the American University of Beirut (AUB), Munir Bashshur, and the Dean of the Faculty of Arts and Sciences, E. T. Prothro, both visited Tallahassee during 1971/72 to promote an interinstitutional relationship with CET. The timing of Dr. Bashshur's trip enabled him to participate in meetings of the International Advisory Council.

There is substantial interest in educational technology in Lebanon, at government as well as university levels. The development of a center for educational technology in Lebanon would, in addition to serving domestic needs, also have the potential for reaching several countries in the Middle East since AUB has many alumni throughout the Arab World in the field of education who are apparently expressing interest in the greater utilization of educational technology within their respective national educational sectors.

In response to this expression of interest, it was possible during the year for Drs. Morgan, Branson, and Massialas to include follow-up visits to AUB in conjunction with other travels in order to discuss and review the kinds of activities which AUB and CET might consider doing together. Institutions in Lebanon identified as being appropriate counterparts for CET might be the Instructional Resources and Service Center at the Faculty of Education at AUB or the recently established Center for Research and Development at the Lebanese Ministry of Education or possibly a combination of both.

In addition to informational exchanges between AUB and CET, there may, in the future, be short-term advisory personnel from FSU working at AUB. Meanwhile, the College of Education at AUB will be sending a graduate degree candidate, Samir Jarrer, to FSU, Fall Quarter 1972, to study educational technology and systems analysis in order to help introduce such courses within the College of Education at AUB as well as to assist with the development of a center for applied educational technology there.

EUROPE

Greece: Liaison. Under other than 211(d) auspices, and in conjunction with requesting permission for three students from FSU to conduct dissertation research in Greece, Professor Massialas, Head of the Social Studies Education Department at FSU and an associate in CET, visited Greece in December 1971. While there he was invited to meet with a number of Greek officials of whom the following were generally interested in educational technology and especially in CET's activities: Dr. Constantine Tsimpoukis, Director of Research in Elementary and Secondary Education; Mr. Dimopoulos, Special Advisor to the Minister of Education (and U.S. trained); Dr. Nikos Georgulas, consultant in regional development with OECD; and Mr. Casmas of the National Organization of Greek Telecommunications. These officials were anxious to arrange for an exchange of information with CET in areas of common interest in educational technology.

Dr. Massialas kept Mr. Theodore Wertime, U.S. Cultural Attaché in Athens, apprised of these discussions and contacts and the latter was supportive of possible exchanges in education and educational technology between FSU and appropriate Greek organizations. Greek officials have subsequently been extremely helpful in completing the arrangements for three doctoral candidates from FSU to undertake their dissertation research there during the academic year 1972/73.

Yugoslavia: Liaison. Through the continuing relationship which exists with Yugoslavia under the auspices of the Slavic and East European Studies Center at FSU, contacts have been established with Professor Branimir Janković, Director of the Social Science Research Institute, who is extremely interested in expanding their capabilities in educational technology. Another relevant institute in Yugoslavia with which CET has contacts is the Institute for Pedagogical Studies which, although traditionally oriented, may be preparing to develop a capability in educational technology.

While there is great interest in the general area of educational technology in Yugoslavia, it remains rather unfocused at present. However, it has been agreed that CET will exchange educational technology materials with appropriate institutes or centers developing this orientation in Yugoslavia.

Germany: Liaison. Contacts have been established with major centers for the development and utilization of educational technology in Germany at the national level and at the state level by Dr. Branson and CET associate Dr. Richard Kraft.

At the national level, discussions have been held with officials of the Department of Planning in the Ministry of Education in Bonn related to educational technology and how information, media materials and personnel might be exchanged. There appears to be a basic common interest foundation upon which to build such an exchange between CET and the Ministry.

At the state level, conversations have been held with representatives of the Center for Educational Research and Development for the State of Bavaria, and with the Director of the Center for Educational Technology in Hesse. While some materials have been exchanged with Dr. Klaus Hinst of Hesse, the liaison relationship with Bavaria has progressed somewhat faster. Dr. Kraft initiated talks in Munich centered on the application of innovative techniques and the use of a variety of media to improve conventional teaching systems. Dr. Schmidbauer came to Tallahassee to return the visit, and consideration has subsequently been given to establishing a cooperating relationship on an educational technology project in Peru.

AFRICA

Ethiopia: Linkage. During his visit to Tallahassee as a member of the CET International Advisory Council, H.E. Ato Paulos Asrat, Vice-Minister of Education of Ethiopia, invited CET to observe and offer suggestions on developments to date and on plans and preparations now underway for the expanded utilization of educational technology in Ethiopia. He also asked that we familiarize ourselves with proposals being generated in Ethiopia by the National Education Sector Review, especially insofar as they relate to the extensive use of educational technology in the implementation of a major rural education program.

In response to this invitation, Dr. Rideout visited Ethiopia in May, as the guest of the Vice-Minister, and subsequently recommended that the establishment of interinstitutional linkages with Ethiopian institutions be considered. The counterpart organization there will, in all probability, be the Curriculum Development and Educational Mass Media Center in the Ministry of Education, supported by cooperative linkages with the Faculty of Education at Hailie Selassie I University.

Pursuant to the initial visit, Dr. Morgan participated as an observer at the Second International Symposium of the Education Sector Review in Ethiopia in July 1972. Dr. Morgan agreed with Dr. Rideout's

assessment that the program contemplated in Ethiopia constitutes a unique and extremely promising commitment to and experiment in the use of educational technology on a broad, interdisciplinary, nation-wide spectrum.

Follow-up activities will be considered after the final recommendations of the Second Symposium are published.

Liberia: Liaison. Through AID/Washington and UNESCO/Liberia officials, CET was urged to establish contacts in Liberia. With the concurrence of USAID/Monrovia, Dr. Rideout visited Liberia to explore areas of common interest with the Ministry of Education, the College of Education at the University of Liberia, and UNESCO related activities especially at the Kakata Rural Teacher Training Institute.

Liberia is presently attempting to reorganize and reorient a substantial portion of its educational effort to reduce costs and to make the system more relevant to the nation's rural and agricultural needs. This effort is receiving support from the United Nations in terms of an IDA credit, and UNESCO advisors are actively involved in assisting the Liberian Government with innovations in its educational program. While there is growing interest in educational technology's role in any educational reform or reorientation, Liberian officials have not yet determined what educational technology's appropriate functions should be or where they should be administratively placed within the educational structure.

However, there is interest in Liberia in exchanging educational materials with CET, and there is also interest within CET in following developments in Liberia especially where they relate to innovative developmental experiences which might be relevant to the utilization of educational technology in a rural environment. Contacts established there with Liberian and UNESCO officials will therefore be continued.

Tunisia: Liaison. With the assistance of USAID/Tunisia, contact has been established with the Director of the Institute of Educational Sciences, Mr. Abdelmajid Attia, who is interested in the development and application of educational technology related to Tunisia. Following a visit by Dr. Massialas in December 1971, there has been a limited exchange of materials and information. Recently, Tunisian officials have expressed a desire to accelerate the growth of their educational technology capabilities, and as they become better organized to accomplish this goal, it is expected that the level of exchange between CET and the Institute of Educational Sciences in Tunis will expand and become more directed.

Uganda: Liaison. At the invitation of AID/Washington and the AID mission in Kampala, CET associate Dr. Richard Kraft engaged in a study of the elementary education system in Uganda and the feasibility of founding additional Primary Teacher Training Colleges there. This six week program established liaison linkages with educators in Uganda which, it is anticipated, will be continued in the form of exchanges of information and materials related to educational technology.

Zaire: Linkage. The reorganization of the National University of Zaire (UNAZA) in August 1971, resulted in the consolidation of all faculties of education at the university level and the placing of that unified faculty at the Kisangani Campus. With the devolution of this responsibility upon the Kisangani Campus came the opportunity to reorganize the academic program of that faculty in conjunction with an evaluation of its overall national research and development obligations and activities. As a result of these events, Zairois university officials from Kisangani became increasingly interested in considering problems related to their new national role. In this connection, the Vice-Rector for Academic Affairs at Kisangani has visited Tallahassee twice, and Dean Fordyce and Dr. Rideout visited the Kisangani Campus to participate in discussions related to the role and reorganization of the National Faculty of Education and of the newly created Center for Interdisciplinary Research on Educational Development (CRIDE). It is now anticipated that the Vice-Rector of the Kisangani Campus will visit FSU and CET during the month of September and that Dean Banwisho of the College of Education at Kisangani, with a member of his faculty, will spend seven to eight working days at Tallahassee in October. The interest of Kisangani Campus officials in designing a program relevant to national interests and including for the first time a major emphasis on the role of educational technology therein, creates a unique and potentially stimulating environment for research and development in educational technology in a French-speaking central African nation.

ASIA

Republic of Korea: Linkage. During the past year Dr. Morgan served as adviser to USAID and the ROK Ministry of Education on planning and initiating the elementary-middle school development project. During this period several events have occurred. The ROK made the decision to undertake a major reform of their elementary-middle school program, essentially as recommended by an FSU study team. An ad hoc project planning group of experienced Korean

researchers was formed in September 1971, to begin project planning. When interim funding (funds available in advance of loan funding) became available, the ad hoc group became the nucleus senior staff of the Korean Educational Development Laboratory (KEDL) which was officially chartered by the Minister of Education in December 1971. KEDL became the research and development arm of the Ministry of Education and the first national and governmental sanctioned educational research agency. KEDL developed a project loan proposal which was submitted to USAID in February 1972. This proposal for approximately 7.5 million dollars is for development and pilot implementation of the new educational system. The new system includes extensive applications of technology.

The ROK proposal was accepted by AID/Washington and the loan agreement is pending formal approval by the ROKG. Project funds are expected to be available from loan sources by October 1972. In the meantime, KEDL has continued developing the detailed planning necessary for the conduct of the project, which will encompass a full range of developmental activities. These include defining educational objectives, materials projection, I-TV programming, teacher training, evaluation, and hardware installation.

In October 1971, the scope of work for FSU's contract was amended to provide for nine short-term consultative specialists to work with KEDL. Dean Phillip Fordyce, Dr. Franklin Sands, and Mr. James Wilkey, all of FSU, have participated in this effort. Professor Benjamin Bloom of the University of Chicago, and Mr. Sidney G. Tickton of the Academy for Educational Development have also contributed. Others are scheduled to go later. The ROKG, using project loan funds, is preparing to negotiate a $580,000, four year technical assistance contract with FSU to continue this support.

Thus, FSU has developed strong, primary linkages in Korea with the Ministry of Education and KEDL. KEDL is planning to send nearly twenty of its staff to FSU for specialized training for periods ranging from six months to a year. There will also be fifteen KEDL people trained for one year under the auspices of USAID/Korea participant traineeships. During Dean Fordyce's visit to Korea discussions were held with Dr. Lee, KEDL's Director, and Dr. Suh, Dean of Education, Seoul National University, as to the means by which these KEDL trainees might continue their graduate education after returning to Seoul. An approach being considered would be to appoint senior professionals from KEDL, Seoul National University, and other appropriate Korean institutions to adjunct professorships on FSU's faculty. In this capacity they could direct individual study and research and offer some group instruction. It would therefore be possible for the student to continue his graduate study and

dissertation research while working as a member of the KEDL staff.

Dr. Bom Mo Chung, Director of the Korean Institute for Research in the Behavioral Sciences (KIRBS), has served as a consultant to CET in the area of low cost applications of technology to education. An important example of such application is the "mastery learning" project headed by Chung in Korea. Discussions are under way with KIRBS regarding ways in which CET may disseminate research findings on the mastery learning experiments. CET and KIRBS have agreed to regular information exchanges and three research associates from KIRBS have been sent to CET for graduate training.

Discussions have been held with Dr. Woo Chul Kang, Dean of Graduate Education at Yonsei University, on applications of instructional technologies in non-formal education and population education. Dean Kang is scheduled to visit Tallahassee in August 1972, to confer with CET staff on research developments and opportunities in these areas.

Thailand: Linkage. Three visits to Bangkok have been made by Dr. Morgan to explore opportunities for CET involvement in Thai educational development. Extensive discussions were held with Mr. Rey Hill, USOM Director, Fred Simmons, Deputy Director of USOM, and Bob Johnson and James Murray, USOM education advisers. Meetings were also held with Minister of Education Boontin, Mr. Suradej Visessurakaru, Deputy Director General of the Vocational Education Division, and several other key MOE staff supervisors. Two immediate activities were identified where CET could provide short-term assistance in Thailand. The first of these related to the training of six Thais, then in progress at CET. This group of vocational educators, under team leader Miss Suree Suvarnasorn, received six months of training in techniques of programmed instruction. The USOM mission and the Thai MOE requested that CET provide follow-up in Thailand for the group when their training at FSU was completed. This follow-up would consist of one CET specialist working with Miss Suree and her team on program validation, expansion of the local training activities, and field implementation programs.

The second support activity was requested by Minister Boontin and Dr. Anan Srisopa and relates to the evaluation activities of the Ministry. Dr. Anan is responsible in MOE for planning a new system for the development and administration of the nationwide twelfth grade testing program. The purpose of this program is similar to that of the statewide ninth grade testing program developed and administered by FSU in Florida. In addition, Dr. Anan is responsible for planning a centralized Office of Evaluation for the Thai MOE. The evaluation functions are presently handled by the several semi-autonomous divisions of the Ministry. The Minister hopes to expand

and augment these evaluative functions by centralizing them. Dr. Anan has asked for consultative assistance in both of these planning functions in late 1972 or early 1973, and CET has agreed to provide these short-term advisory services.

Discussions were held with Mr. Khoo Eng Choon, Deputy Director of the South East Asian Ministers of Education Organization (SEAMEO). CET's functions were reviewed with Mr. Khoo, who serves as a member of the Advisory Board of CET, and he foresaw possibilities for eventual ties between CET and SEAMEO. He furnished CET with SEAMEO activity reports and plans.

Meetings were also held with Bob Van Dijn of UNESCO on the proposed regional UNESCO educational research institute which may be located in Bangkok. Tentative discussions were held on the feasibility of CET relating to this institute for purposes of training, consulting, and cooperating on research and development activities.

Singapore. Bob Jacobs of the regional AID center was contacted for the purpose of establishing contact with INNOTECH. Agreement was reached to maintain communication but due to the move of INNOTECH from Singapore to Saigon scheduled for July 1972 a desicion was made to defer further contact until INNOTECH's status and location became stabilized.

India: Liaison. In response to requests from AID/Washington and USAID/New Delhi, CET has participated to a limited extent on the project analysis process of the Improved Teaching Techniques Elementary Education proposal under consideration there. The purpose of this project is to develop an Indian capacity to apply innovative educational technology as represented by programmed instruction techniques to reduce educational costs while maximizing teacher effectiveness. Given the programmed instruction focus plus the fact that the project is experimental and will emphasize development, testing, evaluation, modification and a continuous revision cycle based on feedback loops, the AID requests for CET's input were fully compatible with the latters capabilities and interests.

Project background papers have been reviewed, discussions with backstopping officials in AID/Washington have been held, and relevant AID officials have been briefed in conjunction with reviewing project documentation. Dr. Morgan visited India on a return trip to the U.S. in order to discuss the project with Scott Hammond and Howard Houston in New Delhi. Based upon that limited on-site review, Dr. Morgan made additional written comments on the proposal to AID/Washington.

There are several Indian institutions which will be involved in this project if it is implemented, and it appears that among those institutions under consideration one would be a candidate for an interinstitutional linkage.

CET is interested in the goals and objectives of this project and in the Indian educators and institutions which will be involved. We anticipate keeping in contact with this project as it evolves because it has the potential for being a major innovative effort in educational technology in the developing world.

Japan, Taiwan, Philippines and Indonesia. Discussions have been held and correspondence exchanged with Dr. Hiratsuka, Director of the National Institute for Educational Research of Tokyo, with Dr. Morales of the University of the Philippines, and with representatives of the Ministry of Education in Taiwan. Descriptive materials on CET have been sent to them, but time has not permitted further follow-up to date. Tentative judgment is that while communication links with these agencies should be developed, their activities in educational technology do not presently justify more involvement by CET.

Discussions were held with Dr. Cliff Liddle (then USAID educational advisor in Indonesia) and Mr. William Platt, of UNESCO/Paris, on educational development activities in Indonesia. AID's involvement in educational support in Indonesia is nearly phased-out and the UNESCO supported educational systems project is in transitional state. Not enough information is available on the Indonesian situation to estimate its interest for CET but there will be additional follow-up in order to make this determination.

F. To serve as a basic intellectual resource center within the U.S. which, through its increase in competence facilitated by this grant and other resources, will be better able to undertake a variety of research, planning, consulting and other performance tasks required by AID and the various other entities involved in the subject area.

EXECUTIVE ADVISORY COUNCIL

Frank W. Banghart, Professor, Department of Educational Administration.

Robert K. Branson, Professor, Department of Educational Research, Director, CET.

Leslie J. Briggs, Professor, Department of Educational Research.

Walter Dick, Assistant Dean for Research and Development, College of Education.

Sydney R. Grant, Director, International Education Center.

Robert M. Morgan, Professor, Department of Educational Research.

CONSULTING ACTIVITIES

BILATERAL CONSULTING

● Dr. Norman Dahl of the Ford Foundation visited Tallahassee in December 1971 to familiarize himself with activities and capabilities of the Center, the College, and the University. Discussions focused on possible ways in which information and publications could be shared between Ford and CET.

● Coordination with the Rockerfeller Foundation has been promoted through Dr. Rideout's consultations with the Foundation in New York and in Zaire on their proposed new program there. It is anticipated that the Foundation may undertake a substantial commitment to the Center of Interdisciplinary Research for Education Development in the Faculty of Psychology and Pedagogy at the Kisangani Campus of the National University of Zaire. This is an institution with which interinstitutional linkages are being considered.

● A steady exchange of information and ideas has been initiated with the Overseas Liaison Committee (OLC) of the American Council on Education through Dr. Rideout's consultancies and discussions with OLC officials, both as regard to Africa and their newly launched activities in the Far East.

● Consulting activities began in May 1972 with personnel from the Federal Correctional Institution located in Tallahassee, Florida. A visit to CET was made by Mr. John Bernharnsen, Coordinator of Vocational Education and Mr. Carl Dooley, Director of Education, at which time they toured the CET media center and obtained advice concerning the establishment of a new TV facility at the Institution. Subsequently, a site visit was made by CET staff during which a discussion was held to determine mutual areas of interest for the prospect of establishing a liaison working relationship.

● The AID Office for International Training expressed an interest in CET conducting a joint training program with the Appalachian Adult Basic Education Center at Moorehead State College in Kentucky. Consequently, Dr. John McLanahan made a visit there to discuss how the two organizations might handle possible cooperative training programs in innovative methods and techniques for providing education to rural populations in developing countries.

● Drs. Branson, Rayner, and Gagné visited the 9th District Educational Services Center in Cleveland, Georgia, where they met with the Director, Mr. Nelson, Mr. Lamb of the State Department of Education Field Services, and Superintendents of all counties. Discussions involved innovative changes in TV instruction and the kinds of adaptations and projections CET is contemplating for educational institutions in the future. The 9th Educational School District was selected as a possible prime pilot area for research because, due to its rural Appalachian environment, it has the potential for serving as a U.S. simulation of a developing country.

● A visit was made to CET by Vice Admiral Malcolm Cagle, Chief of Naval Training. Members of the CET staff and other FSU faculty were available to discuss alternative ways educational technology could be used in the training of Navy personnel. Of specific interest were the problems noted that are confronting the Navy in its all-volunteer service program. Some approaches to instruction, derived by FSU personnel from their overseas experiences which seemed to be of possible value to the Navy, were presented. An invitation was extended to FSU to visit Navy training facilities and study the approaches currently being used.

● Dr. Robert Branson participated in the Annual Conference of the American Educational Research Association at which he attended meetings and presentations dealing with developing nations and new concepts in educational television.

MULTILATERAL CONSULTING

● In order to maintain a current and consistent exchange of relevant information on UNESCO activities in the area of educational technology, Drs. Branson, Rideout and Massialas have included in various trips brief stopovers in Paris where introductions to appropriate officials have been facilitated by William Platt of CET's International Advisory Council who is the Director of the Department of Planning and Financing of Education, UNESCO. In addition, Dr. John Ryan of the International Institute of Education Planning has been helpful in arranging for an exchange of mutually beneficial information with that organization.

● Walter Beneke, Minister of Foreign Affairs for El Salvador, invited the CET staff and its Latin American Students to observe the National Educational Television System, the core of the El Salvadorean Educational Reform Program. This system has great potential for serving as a prototype for other countries. The CET group accepted the invitation and met with personnel from AID, Stanford University, the Ministry of Education, teachers, students, and technicians. Discussions were held concerning the problems of establishing the TV system and making the program operational in terms of technical facilities and teaching personnel. The CET group toured the TV studio and observed the preparation of programs. They also observed classrooms in which TV production was in progress, after which they talked with the El Salvadorean students. The CET students entered small interest group discussions with their counterparts to obtain specifics about their areas of interest. A visit was also made to the Teacher Training University of El Salvador.

● In February 1972 Dr. Branson met in Beirut with William Schechter, President of Beirut College for Women (BCW), to discuss potential arrangements between CET and BCW. Being there are limited capabilities in educational technology at BCW, ways in which CET could assist were discussed. Dr. Branson also discussed with Schechter plans for the future, principally concerning potential consortia sources of funds and joint programs with BCW and the American University of Beirut. A BCW faculty member, Julinda Abu Nasr is currently at FSU, and is regularly invited to attend CET seminars and was also invited to the International Advisory Council.

● Alfonso Ocampo Londono, Director, Department of Educational Affairs, Organization of American States, visited CET to talk with staff members. The purpose of the meeting was to summarize ideas, solicit recommendations, and questions, and examine alternative solutions to present and future OAS programs.

● John Clayton, Chief, Educational Technology Unit, Organization of American States, came to CET and presented an explanation of existing OAS goals and student expectations. There was an information exchange concerning the role of OAS in the future, the existing educational programs in South and Central America, and the part FSU could play in improving education there. Florida State University is to be a training center for high level personnel who can actually affect change in a developing country situation. In addition to directly aiding education, this would improve international communications and cooperation.

AID RELATED ACTIVITIES

● A series of activities were undertaken by CET personnel which were of an advisory/consultancy nature. Illustrative of the scope of these endeavors are those listed below:

At the request of AID officials working on the proposed "India - Improved Teaching Techniques Elementary Education" project, Dr. Morgan visited India and subsequently submitted his preliminary reactions and recommendations to the Chief Education Officer, AID/Washington, in form of a memorandum titled "Comments on the Proposed Indian Programmed Instruction Project."

In response to a request from the Africa Bureau, Dr. Rideout reviewed and submitted comments on a draft bibliography on African Educational Development which AID had contracted the African Bibliographical Center to produce.

At AID's invitation, Drs. Branson and Rideout participated in a conference organized by the Office of Educationaand Human Resources of the Bureau for Technical Assistance organized in March 1972, on "AID Priorities in Educational Development.

Dr. Branson has maintained close contact with the AID supported Regional Technical Aids Center in Mexico City, to whom he has regularly supplied information on recent American publications which should be published for Latin American countries. Over the past year a number of these publications have been translated for Latin American use based on these recommendations.

INTERNATIONAL ADVISORY COUNCIL

Because of the intended emphasis on activities directed toward developing countries, it was deemed essential to solicit advice and continuing contact with international leaders in education. The importance of establishing relations with such prominent figures is crucial in terms of the international scope of expertise they can offer CET. Through their input, CET is able to establish policies based on real needs of developing nations and maintain up-to-date information concerning these needs. In order to acquire this type of continuing information exchange, plans were made in May 1971 to establish an International Advisory Council (IAC). In June 1971 a meeting was held at CET with members of the Executive Advisory Council (see p. 75) and appropriate AID officials. The discussions and presentations focused on: both existing and potential activities of CET; CET's working relationship with AID; and suggested nominations of persons to serve on the IAC. Invitations were extended, and those who are now members of the Council are as follows:

Paulos Asrat
Vice Minister of Education and Fine Arts
Ministry of Education
Addis Ababa, Ethiopia

Walter Beneke
Minister of Foreign Affairs
San Salvador, El Salvador

Charles Benson
School of Education
University of California at Berkeley
Berkeley, California

R. Louis Bright
School of Education
Baylor University
Waco, Texas

D. Ray Carpenter
Department of Psychology
University of Georgia
Athens, Georgia

Harold Enarson
President
Ohio State University
Columbus, Ohio

J. R. Gass
Director of the Center for Educational Research and Innovation
Organization for Economic Cooperation and Development
Chateau de la Muette
Paris, France

Alfonso Ocampo Londono
Director, Department of Educational Affairs
Organization of American States
Washington, D.C.

Arthur Lumsdaine
Department of Psychology
University of Washington
Seattle, Washington

Yung-Dug Lee
Director, Korean Educational Development Laboratory
Seoul, Korea

Eng Choon Khoo
Assistant Director, Southeast Asian Ministers of Education Secretariat
Bangkok, Thailand

Gabriel D. Ofiesh
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In April 1972 the first official IAC meeting was held in Tallahassee, Florida. Also participating in this meeting were members of CET, its Executive Advisory Council, students from various FSU departments, CET's foreign students, and the following members of FSU's faculty and officials of AID/Washington:

FSU Faculty

Stanley Marshall
President

Phillip Fordyce
Dean, College of Education

Howard Stoker
Acting Head
Educational Research

Byron Massialas
Head
Social Studies Education

Richard Kraft
Associate Professor
Educational Administration

Robert Gagńe
Professor
Educational Research

AID/W Officials

John Hilliard
Director, Office of Education and Human Resources
Bureau for Technical Assistance

Samuel Butterfield
Associate Assistant Administrator
Bureau for Technical Assistance

Winfield Niblo
Deputy Associate Director
Local Development

Harold Freeman
Education Officer
Asia/Institutional Development/ Education

Charles Adair
Professor
Social Studies Education

J. C. Chang
Assistant Professor
Social Studies Education

Krisna Kumar
Assistant Professor
Economics

Clifford Block
Office of Education and Human Resources

Bascom Story
Chief, Office of Public Services
USAID/Korea
Seoul, Korea

An indication of the importance of this Council was given by FSU President, Dr. Stanley Marshall, in his welcoming remarks:

> ...This may well be one of the most prestigous meetings this University has had the privilege of hosting... FSU has had a long history of involvement in international education. It is considered by many to be the best center for educational technology in the world which provides the latest word in using a systems approach to solve educational problems effectively and economically.

Sessions during the two day meeting included: reports and discussions on a review of current CET activities and associated projects; priorities for applied developmental research projects in various developing countries; linkages CET should be establishing with national and international organizations; and suggestions from Council members of possible projects which CET should undertake. It was emphasized throughout the sessions that CET was to have a unique role in participating in projects overseas. The points which evolved to clearly define this role were that CET will:

- be a long term (five years) program
- draw from the total University resources
- coordinate and integrate domestic and international actions
- compare and contrast between and among domestic and international activities
- build in modification and feedback loops in its activities

- emphasize experimentation and innovation in educational technology
- find opportunities and places to try new and significant things.

The results of this meeting indicate that the communications network established through the IAC will serve to strengthen CET's mission to establish a flexible, effective, and economical systems approach to educational technology for developing countries.

VI. UTILIZATION OF INSTITUTIONAL RESOURCES IN DEVELOPMENT

UTILIZATION OF INSTITUTIONAL RESOURCES IN DEVELOPMENT

Each objective supported by this Grant makes a contribution, either directly or indirectly, to developmental activities and programs in developing countries. The nature of these contributions has already been addressed in Sections IV and V of this report. A summary of these activities and additional relevant information are presented below:

- Foreign Students: During the 1971-72 academic year there was an average of 400 foreign students enrolled in full-time programs at FSU. Of these, 34 were AID participants. Through 15 graduate assistantships, approximately 12 foreign students were given 211(d) support ranging from three to nine months.

- Consulting: The Center staff and associated members engaged in over 40 bilateral and multilateral consulting activities. Of these approximately half were short-term (see p. 75), the other half being directed toward the establishment of interinstitutional linkages and liaisons (see p. 60).

- Use of Research: Korea project (see p. 61); Dr. Chadwick's implementation of dissertation research in Argentina (see Annex); INPE project (see p. 50); Basic Village Education project in Guatemala (see p. 64).

- Visitors: Approximately half of the visitors to CET during the past year were from or worked with developing countries (see Annex).

- Graduates Engaged in Developmental Work:

Clifton Chadwick, Educational Technology Specialist, OAS, Ministry of Education, Buenos Aires, Argentina: Directing the establishment of a Center for Educational Technology in Argentina.

Gail Rayner, Research Associate, CET: Technical director of training, research, and development projects relating to educational problems in developing countries.

Franklin Sands, Research Associate, CET: Providing technical assistance on the Korean project.

David Sprague, American Technical Assistance Corporation: Engaged in research on nonformal education.

Anan Srisopa, Director of Special Projects for the Ministry of Education, Thailand: Responsible for setting up a national examination program for secondary schools and for establishing a departmental program of planning evaluation.

The following six Brazilians completed an extensive training program administered by CET and are now involved in the following activities for the Instituto de Pesquisas Espacias (INPE):

Amancio F. Pulcherio, Executive of INPE: Educational Technologist, Systems Manager of design, implementation, evaluation, and feedback.

Eudes Coelho Silva, State Coordinator of Adult Basic Education, Telleral Program, Rio de Janerio: Technical writer, documentor of ETV and Radio Education, Program planning.

Jose Antonio Annoroso, ETC Trainer, Instructional Systems Expert: Preparing programs for teacher training, upgrading curriculum and training ETV personnel.

Margarida Efigenia, Systems Analyst: Educational planning and analysis.

Maria Apparedica Forestri, Instructional Systems/ETV Expert: Leader of materials development group and training of teachers.

Maria Kamoi, Control Economist/Planner/Manpower Expert: Planning, Programming, Cost Analyses.

VII. CET'S INFLUENCE ON FLORIDA STATE UNIVERSITY

CET's INFLUENCE ON FLORIDA STATE UNIVERSITY

While the major Grant activities are located in the Center, there is also a continuing effort to involve and draw from the broader expertise of FSU's highly qualified faculty. Not only does this enhance CET's capability, but also increases personnel development in the field of educational technology. Although CET has only been in operation one year, there is evidence to suggest that its expanded presence is already being felt within the University as well as the College.

There is currently on file a roster of faculty members who are interested in participating in educational technology activities through the Center. All departments of the College of Education are represented. Also, the CET faculty is represented on most of the major committees within the College. While it is difficult to measure their contribution in the area of educational technology to academic deliberations, it is undoubtedly pervasive and significant.

Through the Center, an opportunity is provided for academic departments to engage in problem-oriented interdisciplinary endeavors. The Center greatly facilitates the production of trained personnel and research in educational technology and creates an effective vehicle for expanding the transmission of knowledge, new educational models, and educational design and planning expertise both nationally and internationally.

Especially in personnel development, CET is able to plan and coordinate in cooperation with appropriate academic departments (Research and Testing, Administration, Adult and International Education, etc.) graduate degree training programs for potential educational leaders of developing countries.

Each quarter CET supports approximately twenty graduate students, each of whose study and research activities are directed by the Center. Dissertations being produced by these students contribute significantly to the application of educational technology in developing countries. (See Abstracts in Annex.)

CET plays a significant role in maintaining a high level of personal and classroom interaction between foreign and American students and faculty. Many of the foreign students in the College would have been unable to come to the U.S. were it not for their participation in a CET program.

It is anticipated that CET will have an increasing influence on curriculum reform. As more graduate students and faculty become interested and involved in Center activities, the demand for more specialized courses in the field will increase. Inputs into curriculum planning have already begun with the 211(d) Grant providing seed money for a study of the establishment of an undergraduate curriculum in educational technology. The committee making this study was chaired by Dr. Robert Branson, Director of CET, and included other CET staff. Recommendations of this committee are presently being considered for implementation. Also, three new courses developed by CET staff and associates will be implemented during the 1972 academic year. These are annotated on page 56.

Perhaps the most important indicator of CET's influence is the Dean's plan to establish the role of educational technology and CET in a more prominent position within the College. This intent was manifested in a speech made to the faculty by the Dean concerning the forthcoming reorganization of the College of Education, excerpts of which follow:

> Over the past ten years the FSU College of Education has systematically developed one of the strongest educational research and development capabilities in the country. The magnitude of research support received by the College and the prestige of our faculty attest to this proposition, and therefore, it would seem appropriate to focus on research as our primary mission to society. . . . . .
>
> In my judgment, the reorganization plan for the future must reflect the impact that technology and human relations skills are and will increasingly have on society and education. . . . . .
>
> Nowhere is the need for systematic planning and development more evident than when one views the educational problems of developing nations. I anticipate that the experiences which we gain and the contributions that we make through CET will be returned many fold in terms of our own uses of technology.

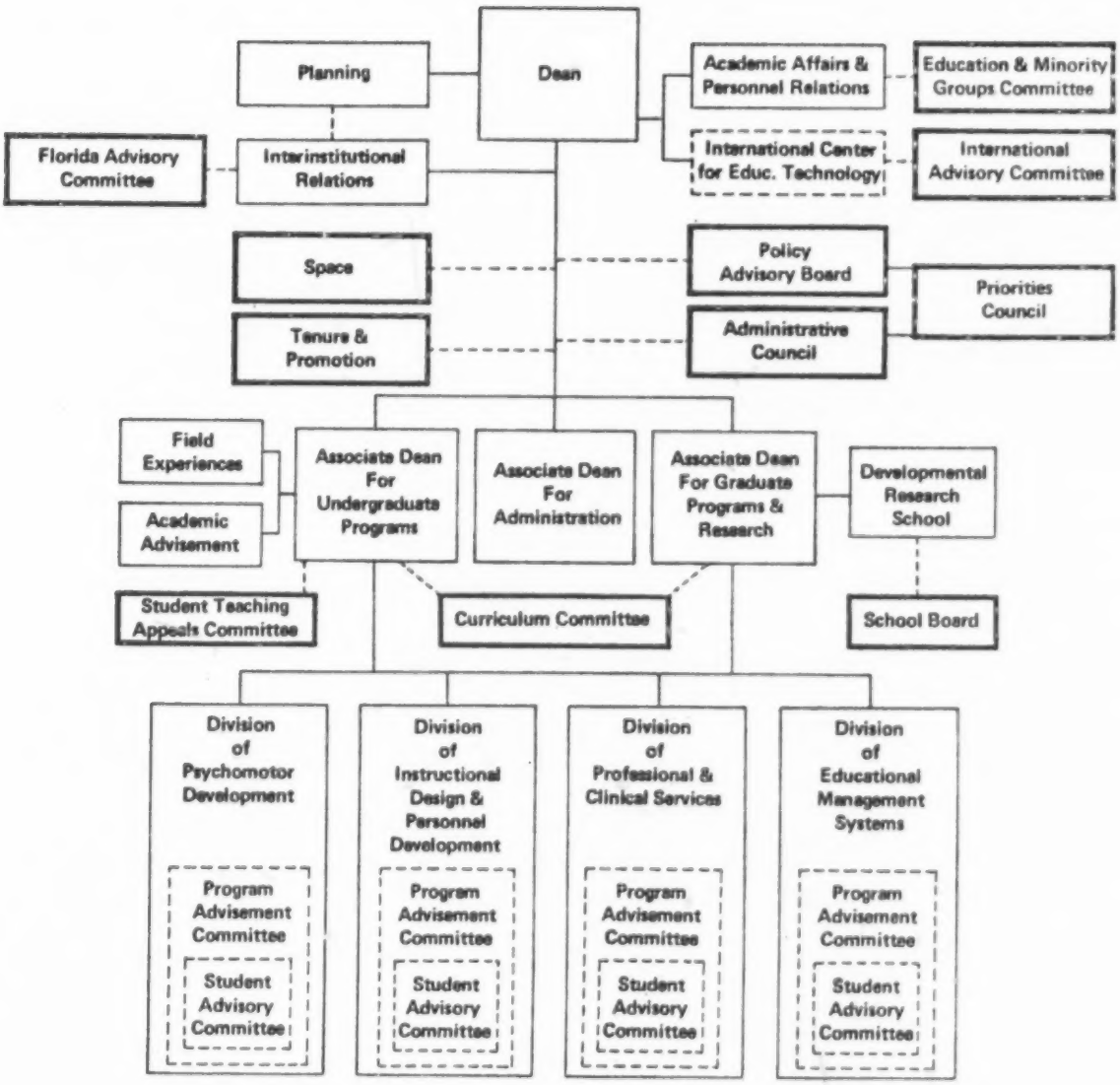
VIII. NEXT YEAR'S PLAN OF WORK

NEXT YEAR'S PLAN OF WORK

During the coming year CET will continue its present efforts directed toward the accomplishment of the Grant objectives. However, the formulation of specific work plans for the coming year is still in a developmental stage as a result of recent events.

The College of Education has initiated a reorganization plan for the entire College. Through this plan CET will be given a more significant role within the College (see Figure 7). The Center has been re-named "International Center for Educational Technology" in order to focus on the primary mission of the Center, which is to serve as the locus of the College activities in the international domain. The major objectives and functions of the Center will remain the same. Through the reorganization, the Center will be provided better access to resources and institutional capabilities. Also, additional senior staff will become associated with the Center, increasing the range of in-house expertise.

Dr. Robert Morgan will return October 1, after a year in Korea, to assume the full-time position as Director of the Center.



Governance Chart
College of Education, Florida State University

Figure 7

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CET PUBLICATIONS, PAPERS, REPORTS, ETC.

Briseno, Gabriela, and Branson, Robert K. "Educational Technology in Developing Countries: A Systems Approach."

Center for Educational Technology. CET Brochure.

Chadwick, Clifton B. A Systems Analysis and Design for the Development of Educational Technology in a Developing Country: The Case of Argentina. Unpublished dissertation.

Eaddy, Pam. A Bibliography for Educational Radio.

Fulmer, Carolyn, and Wilkey, James. Developing Programmed Instructional Materials: A Systematic Approach to Multimedia Design, Production, Evaluation.

Hannum, Wallace H. "A Study of Rule Retention and Accessibility."

Kumar, T. Krishna. "The Design and Development of Optimal Educational Policies."

Layraman, Vira. Elementary Electron Theory: A Programmed Text.

Lee, Anna. A Bibliography for Minority Education.

Morgan, Robert M., and Chadwick, Clifton B. Systems Analysis for Educational Change: The Republic of Korea.

Muangsuwan, Boworn. Booding Chicks: A Programmed Text.

Park, Youngsun. A Bibliography for Educational Evaluation.

Rayner, Gail T. An Empirical Study of Methodology for the Revision of Systematically Designed Educational Materials. Unpublished dissertation.

Rayner, Gail T. Systems Training for INPE Personnel.

Restrepo, Bernardo. A Study of the Effectiveness of Individualized Instruction and Flexible Schooling as Compared to Conventional Instruction and Traditional Schedules of Schooling in Colombian Rural Education. Prospectus.

Sawangkam, Pinit. The Battery Ignition System: A Programmed Text.

Sprague, David. An Empirical Investigation of the Relationship Between Media Preference and Learner Performance. Unpublished dissertation.

Stone, John. A Bibliography for Adult Education.

Stone, Vatsula. A Bibliography for Programmed Instruction.

Suwatmekin, Thongchai. Rose Propagation by T-Budding: A Programmed Text.

Wichaidit, Pinet. Metal Filing: A Programmed Text.

Wilkey, James F. "Techniques in the Production of Programmed Instructional Media."

ABSTRACTS

Chadwick, Clifton B. *A Systems Analysis and Design for the Development of Educational Technology in a Developing Country: The Case of Argentina*. Unpublished dissertation.

This document examined major problems facing education in the Republic of Argentina, and found an overall inadequacy in the nature of educational output and serious inefficiency in achieving that output. Subproblems emphasized were: poorly stated and unclear goals; an inadequate teaching-learning paradigm; lack of adequate evaluation procedures; and serious staffing problems. Also noted were two problems related to educational technology: the lack of development and of training opportunities in the field, and the lack of any organization responsible for initiating change in the educational system. Suggested programs to deal with these problems include:

1. Increased use of validated, multimedia individualized instruction packages.
2. Increased use of television.
3. Reformulation of learning goals.
4. Development of modern formative and summative evaluation techniques for students, educational programs, and innovations.
5. Development of a program to provide extensive training in instructional technology.
6. Formation of a national organization to serve as the agent of educational change in Argentina.

Expected benefits of this program include increased participation in grades four through nine, reduced repetition and desertion, and lower costs per unit and per graduate. Clarification of goals and improvement of educational programs and evaluation techniques should improve the overall adequacy and employability of the output. This could contribute to overall economic gain and reduce dissatisfaction and tension among students.

Hannum, Wallace H. *"A Study of Rule Retention and Accessibility."*

This study examined two problems associated with retention of rules. The first problem was to determine the effect of meaningful original learning on retention. The second was to determine if failure to reproduce what was learned was due to a lack of retention or an inability to retrieve information.

Two groups of students from Florida Agricultural and Mechanical University were taught the rules for finding the number of permutations and combinations of a set of objects, using two versions of a set of self-instructional materials developed for this study. In one version all examples referred to practical and meaningful applications of the rules. The other version used abstract examples that did not include a meaningful context. Fifteen students from each group reached criterion for original learning and were used for the retention study.

After seven days both groups of students were given two retention tests. Each test had eight problems, four about permutations and four about combinations. On the first retention test no student reached the criterion of solving three of the four problems for each rule. Prior to the secord test, all students received a retrieval cue consisting of mathematical notations and application explanations for each rule. The data indicated a marked increase in the retention of the two rules as a result of the retrieval cue. The context of the original learning had little effect of the retention of the rules.

Kumar, T. Krishna. *"The Design and Development of Optimal Educational Policies."*

This paper discusses the conceptualization and construction of optimal educational policy design. Particular attention is given to the characteristics of a general design problem and the problems of information gathering and allocation of joing benefits and costs. The characteristics of a general design problem are discussed and then applied to an example from the field of education. The author explains how various factors that might influence a decision can be compared and their effects combined to give an optimal result. Next the author considers the problem of gathering enough information to solve a decision problem. He points out that most problems are so complex that no single decision maker can acquire all the necessary information. A decentralization plan in which a number of individuals make localized decisions under a coordinating scheme is described and its application to a college situation is outlined. Finally, the author discusses how the theory of n-person cooperative games or team decision theory can be used to allocate joing benefits and joint costs. Using a problem in Educational Planning as an example, he explains how this theiry can be used to allocate funds to several groups in a department in such a way as to maximize the benefits to the department without hurting the individual groups.

Rayner, Gail T. *An Empirical Study of a Methodology for the Revision of Systematically Designed Educational Materials.* Unpublished dissertation.

This study involved development, implementation, and empirical testing of a model for the revision of systematically designed educational materials. The investigation provided empirical evidence that, given a revision subsystem, instructional materials and course operational procedures can be developed which insure that a high proportion of students reach a given level of mastery. The revision process is divided into content and procedural changes. Content changes focus on modules, objectives, diagnostic items, instructional materials, and remedial prescriptions. Procedural revisions focus on pretesting, orientation, in-course operations, posttesting, and grading. Revision decisions are based upon measures of student performance, attitudes and opinions, and upon judgments of content experts and educational technologists, and for procedural revision, upon solicited comments from students. Content revision consists of inclusion, exclusion, or changes in scope, and increased congruence of objectives, items, instructional materials, and prescriptions. Procedural changes include type and manner of data collection; information flow to student; sequencing, pacing, and student and teacher roles; and grading. The criteria for determining the need for changes are performance date, and judgments of students and experts. The model was used to revise a one term required course in health education for elementary education majors at Florida State University. Following the first implementation of the course, seventeen percent of the students using computer managed instruction reached criterion of eighty percent on the final exam. The next term, seventy-one percent of the students using the revised course and computer managed instruction reached the above criterion.

Restrepo, Bernardo. *A Study of the Effectiveness of Individualized Instruction and Flexible Schooling as Compared to Conventional Instruction and Traditional Schedules of Schooling in Colombian Rural Education.* Prospectus of dissertation.

The purpose of this study is to test the effects of individualized instruction and flexible schooling, separately and in combination, upon the internal effectiveness of productivity of selected rural schools in Colombia. The research design can be broken into five objectives:

1. Determine the effect of individualized instructional materials upon student achievement.

2. Determine the effect of both individualized instructional and flexible schooling upon student drop-out rate.
3. Determine to what extent students' achievement is related to parental attitudes toward education.
4. Determine the treatment's effect on teachers', students' and parents' attitudes toward the system.
5. Determine to what extent factors such as student ability and relative degree of economic development interact with the instructional procedure.

The study will be conducted in sixteen schools located in a radius of about sixty miles around the city of Medellin. The schools are in areas of low and intermediate degrees of economic development. Students are of high and low academic ability and are attending the fourth and fifth grades. The subjects to be used in this study are mathematics, science, and Spanish. Results obtained in experimental schools will be compared with results obtained in a control group working under conventional instruction and scheduling. Both groups will be using the same objectives and criterion tests.

Sprague, David M. *An Empirical Investigation of the Relationship Between Media Preference and Learner Performance*. Unpublished dissertation.

The purpose of this study was to investigate the relationship between media perference, in this case instructional television or programmed instruction, and learner achievement. Using percentage scores, rank analysis of covariance, and the Fisher exact probability test, the experimenter tested the hypothesis that those who received their preference would perform better on a posttest and retention test and in a shorter instructional time than those who did not have a choice. The latter group would in turn perform better than those who did not receive their choice. The results showed that although the Prefer group did better, it was not signifantly better. Nor was time a significant variable since there was no correlation between performance and length of time spent on the lesson. An attitude questionnaire indicated that most of the students were satisfied with the circumstances and conditions in which the study was conducted, although a significant number did not want to forsake the typical large classroom situation for this type of individualized instruction. The main finding of this study was that an instructional programmer can design a lesson which, by its organization and logical development, leads nearly all students to mastery. The power of the instructional design

proved to be so strong in this case that different media or preference of instructional method made no difference in achievement.

Srisopa, Anan. *Methodology for Forecasting Manpower Requirements as a Basis for Long Range Educational Planning*. Unpublished dissertation.

This study dealt with the development of a model for forecasting manpower requirements in various occupations as a basis for estimating the number of students who must be trained to meet these requirements. The model consists of the following parts:

1. Forecasting manpower demands by industry
   a. identification and projection of variables which presumably effect employment in each industry
   b. analysis of these variables in order to select the most significant to put in the model
   c. projection of manpower requirements in industry using data about selected variables
2. Translation of employment forecasts, by industry, into estimates of the number of employees required for each occupational group
   a. projection of the ratio of manpower demands by occupational group, to total manpower demands of each industry
3. Translation of employment forecasts by occupational group into estimates of the number of terminal students required at each educational level
   a. projection of the ratio of manpower demands by educational level, to total manpower demands of each occupational group
4. Trend analysis using annual graduate data to forecast manpower supplies by educational level
5. Comparison of estimates of future manpower needs with estimates of manpower supplies.

The model was used with data from Thailand. Results indicate potential shortages of manpower supply in secondary and pre-university, university and teacher training, and excesses in elementary and short course vocational education.

CET STAFF VITAE

ROBERT K. BRANSON, Director of CET, holds a Ph. D. in Experimental Psychology from Ohio State University. He is noted for his publications on programmed instruction and the systems approach to learning, and for many years has been a consultant in these and related areas to universities and corporations. He received national recognition for his leadership in fiscal, operational, and planning activities for the Parks Job Corps Center in Pleasanton, California. In his current position, he guides the research and development efforts of CET. He works closely with officials and leading educators of the developing nations and with key personnel in AID to determine requirements and evolve plans to meet emerging educational needs.

WILLIAM L. BURR, Research Associate, holds an Ed. D. in Educational Research from Florida State University. He served as CET's on-site project manager for the Dependent Schools Project in Karlsruhe, Germany. His prior experience includes public school teaching and administration, and a wide variety of consulting activities for the military and educational organizations dealing with evaluation programs, computers, educational accountability, and curriculum design.

RICHARD M. DURSTINE, Research Associate, holds a Ph. D. in Mathematics from Harvard University. He has done extensive writing in the areas of educational accountability, educational management and budgeting. Currently he is stationed in Brazil where he works with the Ministry of Education, The National Center for Human Resources, and other Brazilian agencies as an Information Management Specialist. In addition, he provides short-term services for agencies in Peru, Colombia, Panama, and Guatemala.

CAROLYN G. FULMER, Research Associate, Product Development Section, received a Master's Degree in Higher Education from Florida State University and is currently doing advanced graduate work in Instructional Systems Design. Since joining CET she has served as a writer, developing instructional materials for all aspects of media design and production. She is presently writing a workbook series for the CET multimedia workshops, and assisting in the organization, administration, assessment and revision of the various workshops operated by the Center.

ROBERT M. GAGNE, Professor, Department of Educational Research, holds a Ph. D. from Brown University in Experimental Psychology. His career began with a series of military positions during which time he conducted research programs dealing with testing, learning, and technical training. He later began extensive studies on the acquisition of knowledge. While serving as Director of Research of the American Institutes for Research, he was involved in general supervision of research programs on human performance, instructional methods, educational objectives, design and evaluation of curricula and educational procedures. From this work came his prominent writings on the conditions of learning. Dr. Gagne serves on CET's Executive Advisory Council and offers guidance and advice on CET activities.

SYDNEY R. GRANT, Director of the Office of International Education in the College of Education and Director of the Latin American Regional Contract, holds a Ph. D. in Supervision and Curriculum Development from Teachers College, Columbia University. Prior to coming to FSU he served as Associate Chief of Party of the Teachers College, Columbia University US/AID Contract Team in Peru, assisting in areas of supervision and curriculum development, and teacher education. He has also had considerable experience at all levels in U.S. public education, particularly in multi-cultural urban settings. His activities with CET have included consulting and participation in CET sponsored workshops in and for Latin American countries.

JAMES A. HATHWAY served as editor for CET publications. His prior professional experience includes eight years as editor and editorial consultant for the Florida Office of Golden Press, Inc. He has served as guest lecturer for several FSU summer institutes and leadership conferences. During his tour of duty in the Air Force he served as editor for various military publications. Author of numerous science books and magazine articles, he also contributed to and served as associate editor for the *Pocket Encyclopedia of Physical Science*.

RICHARD H. KRAFT, Associate Professor, Department of Educational Administration, holds a Ph. D. in Economics of Education from the University of California. He has been actively engaged in research on manpower planning in the U.S. and in developing countries. His writings have dealt particularly with questions of resource allocations, costs, and benefits of education and methods of manpower planning. Several CET participants have taken courses under his direction. He has also served as a CET consultant and provided training services for several CET workshops.

JOHN W. McLANAHAN, Assistant Director of CET, holds a Ph. D. in Experimental Psychology from the University of Cincinnati. He has been actively engaged in research on human behavior for the past thirteen years, five of which were spent in Korea, South Vietnam, and other developing countries. He came to CET from industry where he had spent eight years conducting applied and developmental research on man-machine systems with emphasis on training requirements and evaluation of human operator and systems performance. Since joining CET he has been managing programs in educational research, human resources development, and evaluation.

DAVID B. McMURTREY, CET Media Coordinator, is a graduate of Ringling School of Art, Sarasota, Florida. He has served as Art Director and Producer for various research and development projects involving educational TV productions. He also has experience in graphics design and illustration as well as architectural design. In his present position he is responsible for the design and construction of CET's Multimedia Lab, and coordination of training and production activities. He serves as a consultant on technical aspects of media systems design and utilization.

ROBERT M. MORGAN, Head of the Department of Educational Research, holds a Ph. D. in Psychology from Ohio State University. He has held several prominent positions with organizations such as the U.S. Office of Education, Litton Industries, and General Programmed Teaching Corporation, of which he was President. He has done extensive writing and consulting in the areas of learning processes, programmed instruction, and the systems approach to education, all of which has established his prominence in the area of educational technology. During the past year he served as a Senior Research Advisor in Korea's educational reform program for which CET is providing technical assistance.

DOROTHY S. PAYNE, Librarian for the Technical Information and Materials Section, received her Master's Degree in Library Science from Florida A & M University. She is responsible for organizing and coordinating the acquisition and dissemination of materials on educational technology. Prior to joining the CET staff she worked as a Personnel Specialist for Olin Corporation. In addition, she has served as Librarian and Social Studies teacher in the public high schools of Taylor County, Florida, where she was also instrumental in organizing the Head Start Program.

GAIL T. RAYNER, Research Associate, holds a Ph. D. in Educational Research from FSU. Prior to joining CET she worked in the FSU Computer Assisted Instruction Center developing an empirical study on a methodology for revision of systematically designed educational

materials. She currently directs various phases of CET educational technology training workshops for groups such as Thai vocational educators concerned with the development of programmed materials and various Latin American educators interested in systems training and instructional technology techniques.

WILLIAM M. RIDEOUT, JR., Associate Professor, Educational Research, holds a Ph. D. in International Development Education from Stanford University. He has been involved in educational research, planning, and project implementation in Burma, Tunisia, and Zaire under the auspices of Stanford and Johns Hopkins Universities and AID. His research has focused on education's role in human resources development and, in conjunction with this, he has served on projects and consultancies in Africa with AID, the Rockefeller Foundation, and the Overseas Liaison Committee of the American Council on Education, and the National Academy of Sciences. In addition to teaching and research, his work at CET has been largely focused on the development of interinstitutional linkages with developing countries under the auspices of the 211(d) Grant.

DAVID M. SPRAGUE, Research Associate, holds a Ph. D. in Educational Research from FSU. While at FSU he developed programmed instructional materials in a multimedia format for several college courses. He also served as a consultant for individualized instruction projects at the University Lab School and the Florida Department of Education. During the past year he acted as an advisor to the Latin American graduate students attending FSU on an AID Latin American Regional Contract. In support of the same contract, he helped develop educational technology workshops which were held in various Latin American countries.

JAMES F. WILKEY, Head, Product Development, is responsible for the design and development of CET's Multimedia Workshops. He also serves as a consultant for the application of educational technology in instructional systems development. He has a comprehensive background in instructional media design as applied to vocational and industrial training. His prior experience includes serving as head of curriculum development for Litton Industries and manager of the instructional television station for the Job Corps' vocational training program in California. In other positions with Volt Technical Corp., American Airlines, and General Dynamics, he designed and conducted industrial training programs in scriptwriting, training materials design, programmed media production, and the preparation of training manuals.

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*Presentations given by these visitors are reported in Section V, Objective C.

MULTIMEDIA LAB EQUIPMENT

Prior to the development of the Multimedia Lab, a feasibility study of possible alternative systems was conducted. These ranged from limited to advanced. The table below relates the functional specifications and level of function to dollars. In order to meet the research, training, and production needs of CET, a system at the professional level was selected. This system allows for quality production as well as flexibility in low cost utilization of equipment. Thus, two goals are served. A high level capability for media production is established for the preparation of both in-house materials and cost feasible prototype materials relevant to the needs of developing countries and AID.

	LIMITED	SEMI-PROFESSIONAL	PROFESSIONAL	ADVANCED
PROGRAMMED INSTRUCTION TEXTS	graphic equip. typewriter copier $ 1,000.00	graphic equip. electric typewriter Xerox copier $ 2,500.00	graphic equip. drafting table & drawing machine composer typewriter collating & binding $ 4,000.00	previous system plus printing and production facilities $ 25,000.00
AUDIO TAPE	2 - R-R Stereo tape recorders / mics/ splicer / cassette recorder $ 800.00	previous equip. plus additional cassette recorder stereo mic mixer condenser mics record changer $ 1,400.00	stereo tape decks - 2 cassette decks - 2 patch system / stereo 6 channel mixer condenser mics $ 3,600.00	previous system plus professional audio control console / pro turn tables / add mics wireless etc. $ 5,500.00
PHOTOGRAPHY	35mm Format simple camera copy stand / 35mm enlarger / simple dk. room equip. $ 1,000.00	previous equip. plus 35mm reflex cam. w- metering system add dryer, dry mnt. press, dk. rm. acc. upgrade enlarger $ 3,600.00	35mm, 2 1/4 x 2 1/4, 4x5 film formats/copy stand / copy cam./dryer/ B&W processor/dry mount/complete dark room/45MX enlarger $ 6,500.00	previous system plus add 4x5 cam. 5x7 view cam. color processing & printing equip. $ 9,800.00
8mm FILM	silent-sound-over super 8mm cam. editor-viewer mag. sound record. super 8 projector $ 800.00	silent-sound-over previous equip. plus Honeywell Elmo Cam. or equiv. $ 1,450.00	silent-double syst. previous equip. plus Beaulieu 4008- ZM2 Camera $ 2,000.00	previous equipment plus additional cam. pro-magnetic audio tape recorder/pro- cessing equipment $ 4,800.00
16mm FILM	silent-sound-over editing equip./ mag. recording 16 projector/ Bolex Rex-5 $ 6,900.00	Double System Sync sound - moviola/ double system proj. Beaulieu R16B/mag. sync. audio record $ 12,600.00	Double-Single System Moviola/double syst. projector/ Bolex or Arriflex Camera $ 21,000.00	Previous system plus add camera/ unit elec. editing/ time lapse/ $ 40,000.00
TELEVISION	1/2" Sony system/2- cam/2-VTR/2:1 industrial sync. $ 7,500.00	1" Format/2-VTR- elec. editing/2- cam./video and audio mix/2:1 sync $ 24,050.00	1" RS-170 Sync. 2-VTR-elec. edit./ 3-cam./film chain/ RF dist. system $ 36,000.00	1" Broadcast quality IVC VTRs/Plumbicon cameras/color $ 60,000.00
	$ 18,000.00	$ 45,600.00	$ 73,100.00	$ 145,100.00

DEMONSTRATION EQUIPMENT:

1 - Eastman Kodak AV-105M 16mm Projector
1 - " " M100-A Super 8mm Sound Projector
1 - " " MFS-8 Super 8mm Projector
1 - Bolex SM8 Super 8mm Sound Projector
1 - 3M Sound Slide System
1 - CBS Laboratories/Viewlex Projector
1 - Kalavox Sound/Slide System (used w/carousel projector)
4 - Eastman Kodak Ektagraphic Model B 35mm Slide Projector
2 - Eastman Kodak Carousel 860 Slide Projector - Zoom Auto-Focus
1 - Technicolor 1000B Super 8mm Cartridge Movie Projector
1 - Technicolor 820 Silent Super 8mm Projector
1 - Dukane Model 28A29 Cassette A-V Matic Tape Sound Filmstrip Projector
2 - Viewlex V-1 No. V-175 Single Frame 35mm Filmstrip Projector
1 - Viewlex Previewer Jr. Model 2
1 - Viewlex "Little Giant" V-85
4 - Coxco/Respondex Model RB-30S Student Responders
1 - Coxco Sound/Slide Machine Model
4 - Ampex Micro 5 Stereo Cassette Tape Decks
1 - Ampex Micro 86 Stereo Cassette Tape Recorder
5 - Shure Model SA-1 Stereo Headphone Preamplifiers
2 - Sony CV-2600 Video Tape Recorders
2 - Sony 51UWP 8" Television Monitors
2 - GE 18" Monitor/Receivers

PHOTOGRAPHIC EQUIPMENT:

1 - Mamiya C 220 Camera 2/80mm f2.8 lens and 55mm f4.5 lens
1 - Olympus Pen FT/35mm SLR Camera 2/f3.5 38mm Copy lens
1 - Nikon Photomic FTN, Body, Black 35mm Camera
1 - 55mm Auto-Micro Nikkor-P Lens 2/M2 ring
1 - 24mm f2.8 Auto-Nikkor Lens
1 - 50mm fl.4 Auto-Nikkor Lens
1 - 85-205 Auto-Vivitar f3.8 Zoom Lens
1 - Linhof High Universal Copy Stand
1 - Linhof Folding Copy Light Outfit
1 - Polaroid MP-3 Camera Head w/56" Column and Base
1 - Lighting Assembly for MP-3
1 - 127mm Rodenstock Ysaron Enlarging Lens for MP-3
1 - Seal Jumbo 150 Dry Mount Press
1 - Pakonomy Table Top Print Dryer
1 - Igento 24" Papercutter
1 - Hervic-Quartz Location Lighting Kit
1 - Fotorite D Professional 14" Processor

1 - Leedal Stainless Steel Sink w/splashwall and stand 28x84x5
1 - Beseler 45MX (Photosound) 8mm 4x5" Enlarger
1 - 50mm f2.8 El-Nikkor Enlarging Lens
1 - f5.6 80mm El-Nikkor Enlarging Lens
1 - 150mm f5.6 El-Nikkor Enlarging Lens

CINEMATOGRAPHY EQUIPMENT:

1 - Beaulieu 400 SM Super 8mm Motion Picture Camera w/Angenieux 8-64 Motorized Zoom Lens (fl.9), Macro and Servo-Reglomatic (Automatic Exposure System)
1 - Craig Pro Editor-Viewer
1 - Craig KE Super 8 Projector-Editor
1 - Supersound Super 8 Film Striper
1 - Maier Hancock 816 S Hot Film Splicer

AUDIO/TELEVISION PRODUCTION/TRAINING SYSTEM EQUIPMENT:

Video Production Control Console - which is completely portable and self-contained and, therefore, may be used for both studio and remote production. It contains:

- video production switcher special effects unit
- waveform monitor
- four camera control units
- four camera monitors
- preview monitor
- program (line) monitor
- audio microphone mixer
- audio master line input mixer
- film chain remote controls
- VTR remote control
- RS-170 Sync Generator
- associated with the video console are two vidicon cameras which are equipped with tally lights, intercom, and zoom lenses, and
- a third camera which can be used with the console or a portable 1/2" video tape recorder

Stereo Audio Production Console (portable, self-contained unit) - which may be used independently of the video console; or it may feed one line input of the audio mixer into the video console; or, via the routing equipment within the control rack, one or more of the machines within the audio console may feed the video console while the stereo audio mixer is being used to feed one of the free machines within the console. This unit contains:

- two stereo 1/2 track audio tape recorders
- one stereo cassett recorder
- one stereo turntable
- a custom stereo audio mixer with seven switchable line or mic inputs

Two One Inch Tape Recorder Consoles - each of which contains its own video and audio monitor. These units may also be used in studio or remote locations. Each unit is equipped with electronic editing which increases flexibility and range of production.

Film Chain Island - which contains two carousel 35mm slide projectors and one 16mm film projector with both magnetic (playback and record) and optical sound. The film chain feeds the fourth camera input of the video console and/or the RF modulator for distribution to locations within the building.

Stationary Equipment Rack - which contains audio-video routing equipment and an RF modulator for closed circuit signal distribution to various terminating points within the building.

In addition to the above listings, this system also includes the following:

1 - Portable Quartz Lighting Kit
1 - Studio Floor Monitor
2 - CV-2200 Sony Videotape Recorders
2 - GE 18" Monitor/Receivers
1 - Sony VO 1600 Video Cassette Tape Recorder